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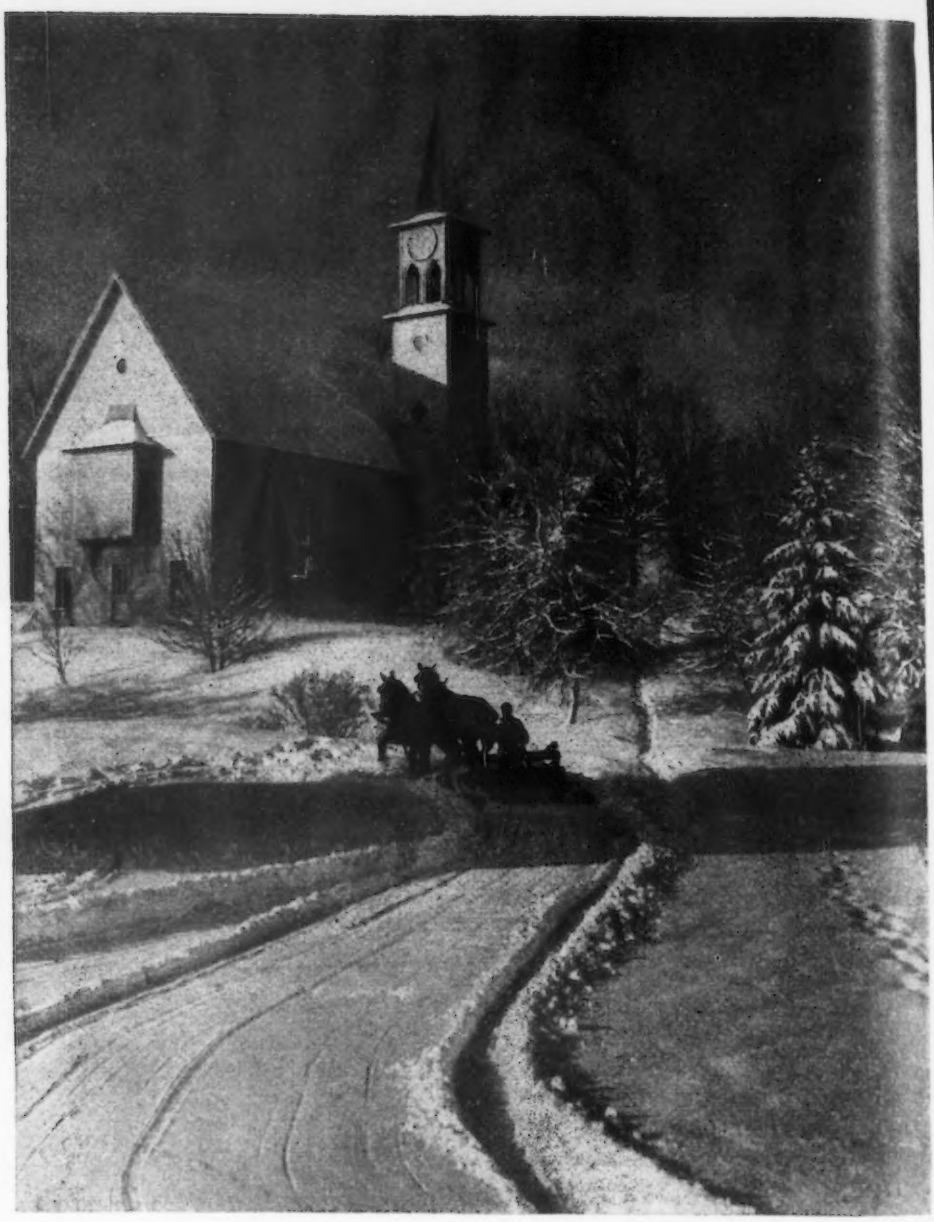

Pathway to Peace

Peace is many things. It is the harmony of nations, the unity of peoples, the comfort of a home—the quiet beauty of a country church at Christmas time.

An intrinsic part of peace is industry. For in industry lie the potent seeds of progress, the hope of prosperity, the way to better living.

We always endeavor to contribute, to the best of our ability, to these ends.

To you, our customers and friends, we extend our good wishes this Christmas time. We shall appreciate your continued patience and understanding during the coming year. And, together, may we make our small contribution toward the pathway of peace.

JOSEPH T. RYERSON & SON, Inc.

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A Fox or a Goose?

NOT quite six centuries before the Christian era, a Greek named Solon lectured the Athenian Assembly on gullibility. An ambitious, wealthy young nobleman named Peisistratus had just rushed into the Assembly bleeding from apparent wounds. He demanded the right to a personal bodyguard of 40 to 50 men, a practice which the Athenians, fearing dictatorship, had banned. The act did not deceive Solon. When he saw that his fellow-legislators were about to swallow this play, he warned them: "Fellow Athenians: Individually you walk with the tread of a fox. Collectively you act like a flock of geese."

This admonition might well be addressed to present-day Americans. Consider European aid. Depending on the manner of calculation, this country has already contributed from $20 billion to $30 billion to European recovery since the end of the war. Unofficial advices from the capital suggest that Truman may ask Congress for another $6½ billion. To this must be added further billions earmarked for European rearmament.

Obviously the purpose of such prodigious sacrifice on our part is not altruistic. Stalin has succeeded to the mantle of Hitler as a menace to world peace. We believe that the free portion of the world shares with us the need for an effective defense against communist aggression. Our contributions are designed to create roadblocks against the sweep of Kremlin power.

The appropriation of added billions by Congress will be painful. The burden of spearheading the anti-communist front has killed all hope of further tax reduction. The President will again ask for an increase in taxes. The allocation of this greater load is the only problem which Congress will discuss.

Let's turn now to France, next to England the principal beneficiary of American aid. Early this month the Radical Socialists, the party of Premier Henri Queuille and Edouard Herriot, at the end of a four-day national meeting passed the following resolution:

"Noting the growing division of the world into two hostile blocs and an atmosphere of distrust and suspicion, the party affirms that France has no responsibility in this state of things and that she ought to limit her action to shielding herself from its effects."

Two days after the adoption of this resolution, the French government expressed the hope that we would release in advance the 280 billion francs (approximately 1 billion dollars) which it is expected will accumulate in the counterpart fund during the calendar year 1949. This sum represents the proceeds in francs of American aid sold in French markets and impounded pending its use for reconstruction and currency stabilization.

The occasion for immediate release of the counterpart fund is "to avoid another heavy exceptional tax levy which Parliament would not accept." The Radical Socialists propose to send Edouard Herriot to Washington to secure the immediate release of the counterpart accumulations. The imposition of a heavier tax for French reconstruction and stabilization might jeopardize the present French government, precipitate a general election and bring de Gaulle to power. For precisely this reason de Gaulle, who has been theatrically sensitive to "foreign interference," wants the release of counterpart funds deferred until he has taken over the government.

What does all this make Uncle Sam — a fox or a goose?

Joseph Stagg Lawrence

► Steel labor will probably get their last big chance for more money in 1949 because that may well be the steel output peak for some years to come. Pensions and social security will be high on the list of union demands. If there is an impasse in steel labor negotiations next year--the steelworkers will strike.

► Biggest job facing motor car producers is to get themselves in a position to cut production costs quickly if a substantial break occurs in the market for new cars. Production problems receiving a lot of attention in Detroit nowadays are: design of the part for manufacturing, machine feeds and speeds, automatic handling between press operations and reduced overhead.

► To avoid building up a distorted cost picture, one mining machinery manufacturer uses an accounting system that carries all additional charges for premium, gray market or conversion steel in a special account. Only regular mill or warehouse prices plus freight appear on the bill of material. Result: when this company can again buy all its steel through normal channels, it will be easy to revise raw material cost estimates any time steel prices are revised.

► At the present time, magnetic taconite concentrate is so fine it cannot be sintered economically, according to some experts. Solution is thought to lie in pelletizing, which can be performed for 60 pct of the cost of sintering, and is perhaps one of the key processes in the preparation of the concentrates of the future.

► Skip welding, a technique of intermittent submerged arc welding, is being used to weld stamped flywheels to forged steel ring gears by an automotive manufacturer.

► Rumors persist in the Cleveland area that a major steel producer is exploring the possibilities of constructing a completely integrated steel plant, from blast furnaces to rolling mills, on the southern shore of Lake Erie to take advantage of low cost water transportation.

► Recently observed in an industrial plant was a list of subversive agencies known to be active in the United States. The list is at least 10 pages long, and single space typed on both sides. The list includes all organizations from pink to purple and classifies them as Communist, Fascist, anti-Republic, etc.

► Unlike some labor leaders who frown on technological improvements, John L. Lewis has registered no complaint about the continuous coal mining machine although it appears certain to have far reaching effects on the industry. Lewis has never kicked about men being thrown out of employment providing those left on the job get better pay for shorter hours.

► Fabrication in transit freight rates under a strict f.o.b. system may not continue. Some consumers in the past have made money by using such rates under the old delivered price system. Freight experts declare the key to this possibility rests on whether a buyer can retain ownership during the entire movement.

► A close nationwide check reveals that the gray iron foundry business is singing the December blues. Hardest hit are the small jobbing foundries. The big tonnage foundries are holding up better. But one reason is that they have called in some of their work that had been farmed out to the jobbing foundries. Most frequently heard explanation is that the slump is caused by year end inventory corrections.

► Steelmakers looking for escalator clauses in government contracts are worried about the fact that some allow for only 20 pct increases. Not that any now have plans for big increases in base prices. But those who haven't announced hot rolled sheet and strip extras know that others have so far boosted those extra charges by far more than 20 pct. Besides, they're worried about the effect of all steel prices on the fourth wage round.

► Contrary to the opinion gaining credence in some quarters, the United States is not a "have not" nation in metals production. This country is the largest mine producer of copper, lead and zinc in the world and current exploration programs are expected to continue our leadership. But our consumption of metals has been stepped up tremendously so that we are heavily dependent on imported metals and concentrates.

► A plan for the expansion and reequipment of Brazil's railroad system at a cost of more than $300 million was recently submitted to the Transport Committee of the United States-Brazil Technical Mission. Largest allotment of funds under the program is for rolling stock and the second largest is for rails. Special provision is to be made for electrification of the project.

Repairing Gray Iron Castings by Welding

Recent advances in welding and welding equipment have caused a widespread increase in the use of welding to achieve longer life and more efficient service from industrial equipment. Repair and maintenance of cast parts in such equipment by welding, as described in this article, offers many economies.

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By L. AMES

Air Reduction Sales Co., Philadelphia

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RESULTS when gray iron castings are more or less variable, especially with heavy castings where it is difficult to achieve satisfactory local conditions for making welds. Such welding is usually confined to salvage or repair work occurring at infrequent intervals, each job presenting a different problem.

A number of methods have proved successful, but the most common methods in use are oxyacetylene welding or brazing, metallic arc welding, and carbon arc welding. To achieve maximum results from these methods, certain procedures should be followed before, during, and after each welding operation. These fundamental procedures relate to preparation, alignment, preheating, equipment and proper working conditions.

Preparation for welding is influenced and should be preceded by a consideration of the type of service required of the casting. It is a good rule to check its weldability. Chips can be checked to determine whether the casting will tin easily if it is to be brazed, or whether it can be readily welded with the torch or metallic arc if these processes are to be used.

Other points requiring preliminary consideration are: (1) Whether a color match is necessary; (2) whether the welded section will require machining, drilling or tapping after welding; and (3) whether the casting is to be subjected to a temperature of 500°F or over. In chemical processes, materials may be used that do not affect cast iron but will affect bronze. Ammonia pumps are a good illustration. It is obvious that repairs to cast iron parts in such cases should be made by fusion welding.

Following these preliminary considerations, the casting should first be cleaned to remove all oil, paint, grease and rust. It is then chipped, ground, or burned to within $\frac{1}{8}$ in. or less of the bottom of the fracture. Chipping is preferable, because it leaves the cleanest surface.

If the casting has been V-cut with a torch, a carbon arc or metallic arc, it should be ground to remove as much of the oxide as possible. The top surface adjacent to the V should be cleaned at least 1 to 2 in. on each side of the edges of the V. Sections 1 in. thick or less are usually chipped from one side only. On heavier sections, it is advisable to chip from both sides, provided both are accessible to welding. Generally, a 75° or a 90° V-joint is wide enough to enable the operator

to manipulate his torch or electrode and to get to the bottom of the joint.

If metallic arc welding is to be used in a V-joint, it is desirable to use threaded studs in the groove. These may vary in size from ⅛ in. for thinner sections to ½ in. for heavy sections. Distribution of studding is important. On the smaller sizes, the studs should be ½ in. apart and evenly spaced over the weld area. On the larger sizes, they may be anywhere from 1 to 2 in. apart. Care must be taken to obtain good fusion around and to the studs, thus attaching the metal to the studs, which in turn are secured in the cast iron below the heat-affected zone.

Proper alignment is important. Pieces that have broken out should be checked to make sure that none are missing. These can sometimes be welded together on a bench, and then tack-welded in one piece. The requirement for accuracy of alignment varies with different types of work, especially when shaft bearings or similar objects must line up properly in the finished job. C clamps, bars, wedge bars, turn-buckles, V-blocks or jigs should be used when one piece has to be held in place during preheating and welding.

Small castings of intricate shape are usually harder to hold in alignment than large sections. It is advisable to follow out a sequence during the welding operation to avoid distortion or warpage.

Heavy castings present special problems in alignment. They offer less danger of distortion and warpage, but require proper spacing and support to reduce sagging during preheating and welding. Too often failure blamed on warpage is caused by sagging because of improper support.

It is sometimes possible to salvage a casting that has sagged out of alignment by reheating and sagging it back into place with weights while it is heated. However, properly supported and aligned castings can usually be held to tolerance if welded in the proper sequence.

Preheating before welding helps avoid shrinkage stresses and subsequent cracking caused by uneven expansion during welding and by contraction upon cooling. The hard zone adjacent to the line of fusion can be avoided when the casting is gas-welded and can be reduced when carbon or metallic arc processes are used. Preheating also saves welding gases. When the fracture is confined in the casting, generally the entire casting should be preheated. However, if the fracture is in a section that can expand endwise, a local preheat is usually sufficient. Slow preheat is best, as it enables both the heavy and light sections to absorb heat uniformly, and permits uniform expansion over the entire casting.

Charcoal is the preferred fuel for preheating purposes, because it burns with a soft, even heat and requires no forced draft. No soot or smoke is given off to deposit on the metal or hinder the welding operation. However, provision should be made for escape of carbon monoxide gases produced.

Torches are available for such preheating fuel gases as kerosene, oil, natural gas and propane. Care should be taken to move the torches from time to time so that they do not play too long on one point of the casting. Moving them spreads

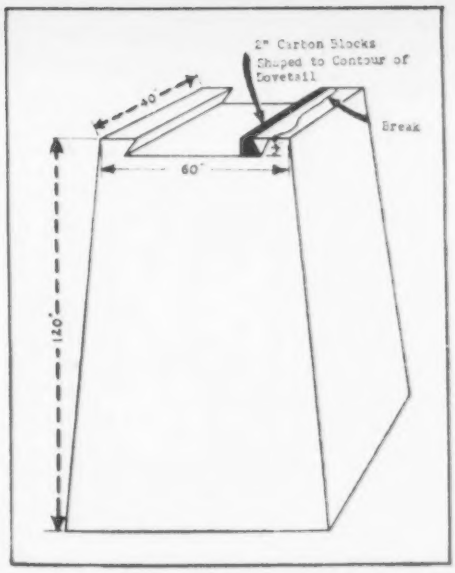


FIG. 1—Using a carbon block shaped to the contour of the dovetail of this 60 ton forging hammer anvil base, the break shown was repaired by fusion welding.

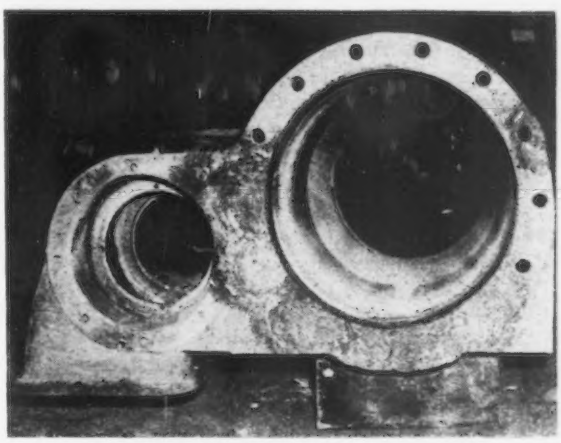


FIG. 2—Top and front view of the steam chest showing weld repairs made to the flange. The flange thickness varied from 2 to 4½ in.

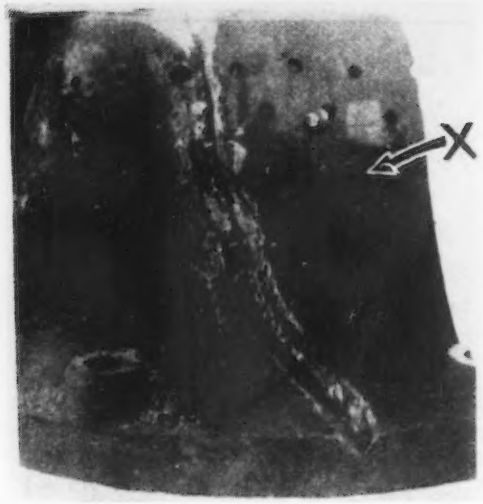


FIG. 3—This broken steam engine base was brazed after it had been previously repaired by arc welding.

the heat evenly. When heavy and light sections are present in a casting, the heat should be directed more to the heavier section to obtain the greatest degree of uniformity between the heavy and light sections. For gas torch or carbon arc welding a preheating temperature of 1000°F, or over is preferred; for brazing or metallic arc welding 500°F is usually sufficient.

In gas welding or brazing a heavy casting, a great deal of heat input is required at the surface adjacent to the weld to compensate for heat losses due to conduction by the casting. Naturally, the heavier the casting, the greater the flow of gases required for this purpose. Equipment should be used that will deliver the necessary gas for heavy welding jobs of this type. When large tips are used, three or more acetylene cylinders should be manifolded together to assure an ample supply.

Standard acetylene regulators deliver 150 cu ft of acetylene gas per hr at 15 lb pressure, which is ample for the average welding or heating tip so long as the hose is 5/16 in. ID with large glands to reduce restriction to gas flow. Torch tip extensions are sometimes used to lengthen the distance between the operator and the molten puddle, thus reducing the heat radiated on the operator. Arc welding helmets, with No. 5 or No. 6 shade lenses, are also sometimes used in place of goggles to give more protection to the operator's face.

Large castings, 1 to 6 tons, radiate a great deal of heat when preheated to 1000°F or over, causing undue operator fatigue unless he is relieved at frequent intervals. On large welding operations, enough welders should be scheduled to relieve at intervals of 20 to 30 min. This is good practice from a safety angle, and enables the men to do a better job with less fatigue.

An example of fusion welding on a cast iron section weighing 60 tons is illustrated in fig. 1. Good compression strength and resistance to a certain amount of impact are required of this section of the anvil base under service conditions. The dovetailed groove tapers from front to back, which allows fitting several types of anvils in the groove and holds them firmly in place. The broken section of the dovetail was 40 in. long, 6 to 10 in. wide, and about 4 in. thick, and had to be built up to restore its size.

On several occasions attempts had been made to repair the anvil base by studding the electric arc welding. Because of impact and compression at this point of the base, the welds pulled away and in time studs loosened up. Bronze welding was tried, but was found to mush out and be too soft.

Oxyacetylene fusion welding was suggested. All the old bronze weld and studs were chipped out to good, sound metal. The casting was preheated for 18 hr, using three natural gas torches. The torches were moved every 2 hr to insure even spread of the heat into the casting. During the last 4 hr of preheating, more compressed air was used in the mixture. By so doing, the area to be welded and its adjacent area were preheated to as high a temperature as practicable to avoid any line of demarcation at or near the weld area. The importance of getting a good soaking heat into heavy castings prior to welding cannot be overemphasized.

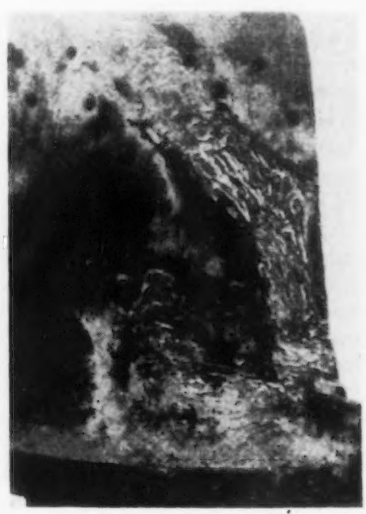
At the start of the welding operation, operators played their torches on the weld surface until the proper temperature was reached before any metal was added. A good grade of cast iron will flow

LEFT

FIG. 4—Another section of the base in fig. 3 shows the previous carbon arc weld removed prior to brazing.

RIGHT

FIG. 5—View of the section shown in fig. 4, after brazing. Cracks in the two sections of the base were repaired separately.



practically the same as bronze when the right temperature has been reached.

Two-flame tipped torches with 12-in. extensions were used to reduce heat radiation. Six welders were used on this job, relieving at intervals of 20 min. Two laborers assisted, breaking the welding rod into small pieces, changing cylinder manifolds and doing other odd jobs for the welding operators.

Cast iron rod used on this job was 3/16 and ¼ in. diam. It was found that by breaking the rod into 1 to 2 in. pieces and shoveling them into the puddle, more metal could be added in a shorter time. Smaller diameter welding rod would melt with one pass of the torch. Larger diameter rod would melt on the surface, but the bottom of the rod would lie in the molten cast iron and presented danger of cold rod laps or laminations.

The torches were held so that the blue flame was anywhere from ½ to 1 in. away from the molten cast iron. It was found that this method permitted a better spread of heat and reduced the tendency to develop blow holes in the weld metal. Both gases were manifolded.

Total welding time was 16 hr, representing a total of 96 hr of torch time for the six welders. Rod consumption totaled 275 lb and 14 lb of flux were used. Gas consumption totaled 4500 cu ft of oxygen, and 4200 cu ft of acetylene. Estimated saving over the cost of a new base was $6,200, and savings in down time close to $18,000.

A Pennsylvania steel mill had a break in the piston rod of a universal mill reversible engine, used for rolling steel plate. The impact of the piston broke the cylinder head and pulled the studs out of the cylinder flange, breaking out sections of flange.

A screen or netting was placed about 20 in. from the top of the cylinder. When the plate was removed to show the inside of the preheating oven, the temperature of this casting was approximately 1200°F. The outside section of the preheating oven was ½ in. plate tacked together to keep the outside of the casting from cooling too rapidly.

The operators played torches around the area to be welded. This was done prior to adding filler material. To avoid building a welding platform, the bottom was placed in the locomotive pit. The bottom was covered in the same way as the top to reduce draft on the charcoal. Small openings were made in the asbestos paper on the top to reduce heat loss as well as heat radiation on the operator's face.

Top and side views of the cylinder several days after it had been welded and cooled are shown in fig. 2. The thickness of the flange varied from 2 to 4½ in. at the steam chest. No blow holes or porosity were found in the deposited weld metal. The weld was later machined and found to be without hard spots or porosity; nor was there distortion in the cylinder.

The cylinder, from a Porter-Hamilton reversible steam engine, has a bore 30 in. in diam, is 7 ft 2½ in. long, and weighs 10,700 lb. The cost of a rough casting before machining would have been $1,975, and the cost of the machining would have been $1,500. By contrast, the repair job involved 60 lb of ¼ in. cast iron rod for filling

FIG. 6—This broken bearing pedestal of a Corliss engine had been previously repaired twice by welding and once by drilling and plating. Large gaps, caused by pieces that broke out and were lost made the repair job more difficult.

in broken stud holes, 5 lb of flux, 800 lb of charcoal, and 8 hr of continuous labor by a crew of three.

Some years ago, a failure occurred in a section of a 750 hp steam engine used for powering a 26-in. alloy steel plate mill. A local job shop carbon arc welded the base, using steel plate to reinforce the weld. The effectiveness of this repair job is evidenced by the fact that the engine gave 25 years more of continuous service before breaking down again.

The second break in the engine base is shown in fig. 3 with some of the old carbon arc weld removed on one side. The *X* indicates some of the old carbon arc weld that was not removed in preparation for the new brazing job.

Another section of the base, with the old carbon arc welds removed, is shown in fig. 4. The wide gaps were corrected by tack-welding a steel plate on the inside of the base, which acted as a backup for the bronze. The old carbon arc weld, too hard to chip, was washed out with a torch, accounting for the wide gaps. This section is shown in fig. 5 after brazing.

The cracks in both broken sections of the base were welded separately then aligned so they could be brazed at the bearing pedestal. The weight of both sections was 12 tons. With all of this welding, the pedestal casting was found to be less than ⅛ in. out of true, which was taken up by the bearing. This job was welded from each side simultaneously.

The steam engine upright had a piece broken

FIG. 7—A side view of the broken pedestal shows the turnbuckles for aligning the parts for brazing.

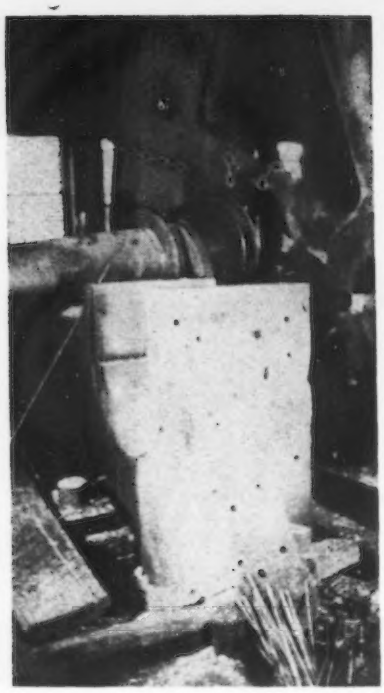


FIG. 8—After brazing the engine pedestal appeared as shown here and savings by welding were reported to be about $4200.

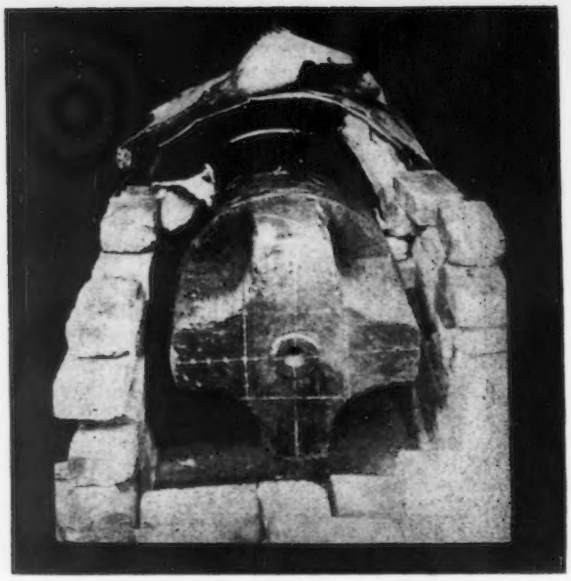


FIG. 9—Preheated to 900°F with a torch, the wobbler end of this roll was built up by carbon arc welding.

out and missing. A 2-in. steel plate was used to replace the broken section at the bottom. This was later machined to the proper contour required on the upright. The base plate to which the vertical steam engine was bolted was grouted into a concrete base in copper to absorb shock and vibration. This plate is 5 in. thick, 16 ft long, and 11 ft wide. It was chipped from both sides to a 90° bevel. Two operators worked simultaneously on the job. One pass was put in by each man from each end, working towards the center. The casting was turned over, and the process repeated on the opposite side. Each of the welds on this plate was 48 in. long and about 3 in. wide on the top surface.

This engine was used on a 26-in. stainless steel plate mill, an old type hand mill on which catcher, passers, and rollers are used, so that there were over 100 men made idle by its failure on a three-shift per day basis. All this welding was accomplished in four days. Three men were used on each shift, working on a 24-hr day welding basis, with a total of nine welders. Two laborers were used on each shift for miscellaneous work. Gas consumption for melting out the old carbon arc welds and for brazing totaled 15,500 cu ft of oxygen and 12,000 cu ft of acetylene. The job used 1050 lb of bronze rod and 50 lb of flux. According to the chief engineer, salvage of the old engine saved about $50,000. However, the savings on down time loss were many times greater, for no new engine or even parts for an old one could have been obtained.

A manufacturer of soil clay pipe had a 500-hp Corliss engine that had fractured at the bearing pedestal. This engine was about 50 years old, and a new base was not available, nor was it possible to obtain patterns. A local job welding shop tried to do the job on two different occasions, and both times the welds failed because the crack had not been chipped to the bottom of the fractured section. The company was convinced that welding was no good, and the pedestal was drilled and plated. The engine worked this way for ten years, when the studs finally worked loose and repairs had to be made again.

The front view of the pedestal in fig. 6 shows the holes used when the pedestal had been plated. The large gap was caused by small pieces that had broken out over a period of time after studs became loose. Pieces of steel plate were used to backup bronze during the brazing operation.

The side view of the pedestal in fig. 7 shows the turnbuckles used on the sides, the plate on top and the 2-in. square stock in the center section for alignment. Four welders were used on this job continuously for 11 hr, two men at one time working from each side.

The pedestal, after brazing, is shown in fig. 8. Engine bolts were loosened before preheating with an oil torch for expansion at the bottom of the pedestal. The job shop manager now has two welders working continuously on repairs in this plant because he was successful with this job. Savings were around $4,200. Rod used amounted to 190 lb of bronze, and gas consumption came to 1800 cu ft of oxygen and 1700 cu ft of acetylene.

In both of the last two jobs described, bronze was recommended and used as the filler material. This choice was made because fusion welding would not have been practical for either job; nor would carbon arc welding have served because of wide gaps and other factors such as contraction strains even with preheating.

The metallic arc could have been used, but, in both cases it was too hard to chip and therefore was too hard to drill for studding. In both instances, brazing was suitable, metal deposit was rapid, and preheat temperatures before and during the welding operation were low.

In the use of alloy steel and cast iron rolls for rolling purposes, wobbler ends generally offer some probems because of wear and batter from

impact and abrasion. Repairing wobbler ends is usually a standard welding job, the frequency of building up depending to a great extent on the supervision and condition of the mill in which they are in service.

Fig. 9 shows a roll set up for carbon arc welding. The wobbler end was preheated to 900°F, with a natural gas torch and welded with the carbon arc. A water cooled carbon arc torch with ¾ in. carbon rod at 500 amp current was used. The wobbler ends were then brought back to size with the carbon arc torch. Filler material was ordinary cast iron rod employed for gas welding purposes. A steel template is usually made up to sheet metal, and the worn wobbler ends are brought up to template size, and can be checked during the welding operation. The welds were hard enough to give good wearing life without spalling in service.

Preheating of the base metal for metallic arc welding is not required. However, a hard zone adjacent to the weld area will occur if preheat is not used. All electrodes for welding cast iron, whether ferrous or non-ferrous, will produce a high hardness in the heat-affected zone. With preheats of 500°F or over, there is a marked reduction in the hardened area adjacent to the weld, thus reducing the danger of cracked welds, especially on castings that offer restraint to the weld while cooling.

However, with the nickel steel type of electrode, welds are soft, can be machined, and the hardened area near the weld is very narrow, especially when low currents and small diameter electrodes are used. It can be machined on cast iron that has not been preheated. There is also less tendency for this deposit to crack off. Repairs are now being made that were not possible with the old ferrous or Monel types of electrode so widely used in the past.

The neck of one roll was badly galled and worn ventional measuring devices as tool makers It was preheated to 450°F and nickel steel was applied over the entire bearing surface to a thickness of ⅛ or 5/32 in.

The entire surface was coated with nickel steel, prior to the application of medium carbon steel. The nickel steel forms a good bond to the cast iron and bonds readily with the medium carbon steel. After the medium carbon steel had been applied, the roll neck was ready for the machine shop. About ten roll necks have been repaired in this way with excellent results.

There are any number of possible uses for the nickel steel type of rod on cast iron repairs or for building worn surfaces back to size. However, they do not offer a cure-all, and care should be exercised in their use. Although tensile strength of deposited metal is not too high, the rods can be used in conjunction with other types of rods.

Floating Bearings Minimize Vibration

A NEW type of bearing has been designed to eliminate vibration by allowing the shaft to rotate about its axis of inertia. The shaft makes no contact with the bearing, being supported entirely by fluid pressure. This condition can be maintained, even when the shaft is stationary if the fluid is pressurized by an independent pump.

The interior of the bearing has recesses and grooves as shown in fig. 1a. The recesses are fed with lubricant under pressure and this lubricant escapes along the grooves as shown in fig. 1b. If the shaft is displaced toward one recess, the area through which the fluid can escape from that recess will be reduced and the pressure in it will increase. Conversely, the pressure in the opposite recesses will decrease. Thus, any displacement produces a change in the lubricant pressure distribution, which returns the shaft to the central position, stabilizing the equilibrium.

Fig. 1b shows a bearing for a shaft subjected to loads varying in magnitude and direction. Fig. 1c shows an arrangement for a shaft under constant load. The lower recesses in fig. 1c are fed with lubricant under pressure and each of the lower grooves, A, B, C, and D communicates with the opposite recess by the orifices, a, b, c, and d, respectively. The lubricant finally escapes along the upper grooves. If the shaft is displaced toward an upper recess, the pressure there will increase, because the area of escape is reduced and the area of supply (the lower groove) is increased.

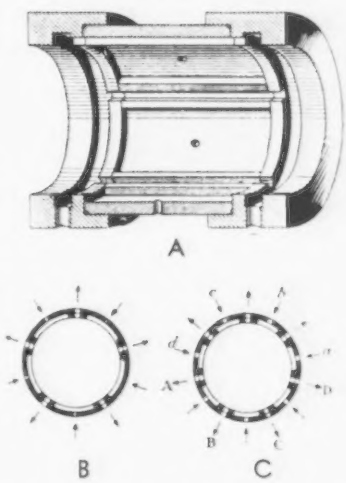


FIG. 1—The lubricant grooves and ports of the floating bearing are shown in *a*, while *b* shows the design for a shaft subjected to loads in varying magnitude and direction and *c* shows the design for a shaft under constant load.

In a spindle grinder fitted with two bearings of the type shown in fig. 1b, using water at 70 psi as a lubricant, the spindle was run for 50 hr without wear at speeds in the region of 18,000 rpm. Shaft diameter was 1 3/16 in., with about 0.001 in. play between the shaft and the bearings and an exaggerated overhang of 4¼ in.

The bearing was described by M. Paul Gerard in *Comptes Rendus*. Three other sets of bearings have been run, and an experimental model has been run with compressed air as a lubricant. In general, the expenditure of energy in compressing the lubricant is justified by the reduction in frictional loss.

How to Make Best Use of

The use of gage blocks in precision measurement of machined parts is greatly enhanced by the use of such accessories as the sine bar, surface plates, master flats, master squares, base blocks, adjustable holders, caliper bars, trammel points and similar items. The use of these accessories and their limitations, typical applications, and the accuracy of such accessories are discussed by the author.

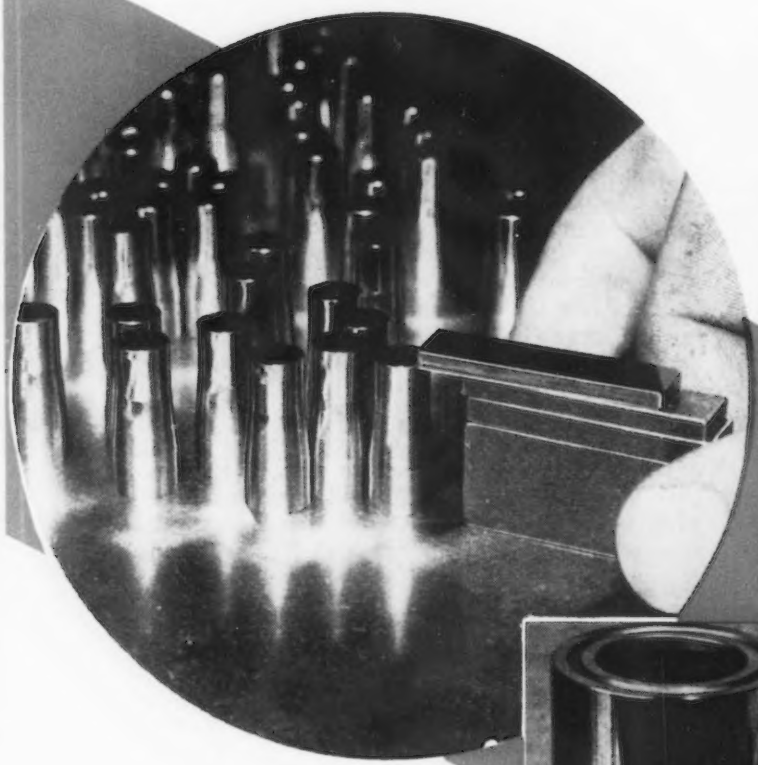


FIG. 1 — Accuracy of flatness of a surface plate must be within 0.0003 in., if it is to be used directly or indirectly with gage blocks.

o o o

FIG. 2—The accuracy of this comparator gage anvil is being checked by a master flat and master square. These two accessories jointly represent the most precise 90° angle possible.

WITH the increasing demand for precision in machined parts, the value of gage blocks can be appreciated only if the user has at least a basic understanding of related precision accessories. Gage block accessories can be classified in two distinct groups. The first group consists of truly precision instruments in their own right, and can be effectively used with or without gage blocks. The second group provides a variety of made-up precision measuring instruments inseparable from gage blocks for their functioning. One accessory, the sine bar, is necessarily a part of both groups, but in this discussion it is classified in the first grouping.

Because of their nature and other various factors, gage block accessories do not incorporate a precision equal to that of *laboratory* grade blocks. Their use is therefore limited to *inspection* and *working* quality blocks, which are directly related to production. The fact remains that all accessories are finished to the highest degree of accuracy scientifically possible to coincide with and safegard the accuracy of the blocks with which they are used.

Most commonly used and included in the first classification are such accessories as the surface plate, master flat, master square, and sine bar.

The flatness accuracy of a surface plate varies as does its working area, and considered in this article is the surface plate intended as an auxil-

Gage Block Accessories

By H. J. CHAMBERLAND
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iary to the master flat for precision measurements not within the capacity of the latter. Assuming that the plate is made of selected close grain iron and completely stabilized, its surface is nevertheless one that is scraped rather than lapped. If gage blocks are to contact such a surface, directly or indirectly, specifications call for a flatness accuracy within 0.0003 in. Such flatness is far from one of optical quality, but it does permit the direct use of gage blocks as in fig. 1.

It is highly important to maintain the original accuracy of the surface of the plate by giving it proper care and, particularly, not bringing it in contact with surfaces of an inferior finish. The 0.0003 in. accuracy of flatness is verified with gage blocks previous to the delivery of the plate and can likewise be checked as often as necessary by the user. This inspection procedure is simple. Three accurate gage block combinations of identical height are used with the longest straight edge available. The combinations are positioned on the surface plate for the straight edge to rest from its ends and center, and any low spot can then be readily determined by the feel of any one of the combinations as the setup is moved to various points of the surface. A dial indicator gage graduated in tenths can also serve a similar purpose, providing the bottom of its base has a desirable accuracy of finish.

The master flat is by far a more precise accessory than the surface plate because the top surface of the master flat is lapped and held within limits of 10 micro-inches per sq in. to 3/16 in. of the edge. Standard dimensions of the master flat are 5 x 7 x 1⅛ in., with sides and bottom surface ground to a commercial finish. Gage blocks may actually be wrung to its lapped surface, which explains why gage blocks and optical flats are used to test the accuracy of master flats in the course of manufacture or when returned for reconditioning.

As the master flat is a base designed for gage

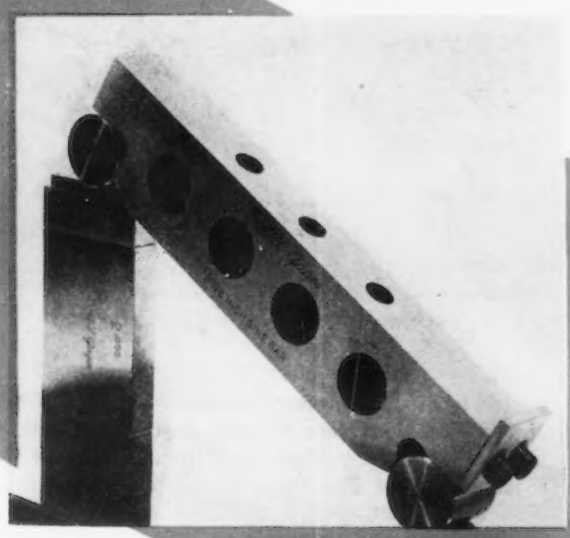

FIG. 3—The sine bar, master flat and proper gage block combination provides an angular setting accurate within 2 sec of arc.

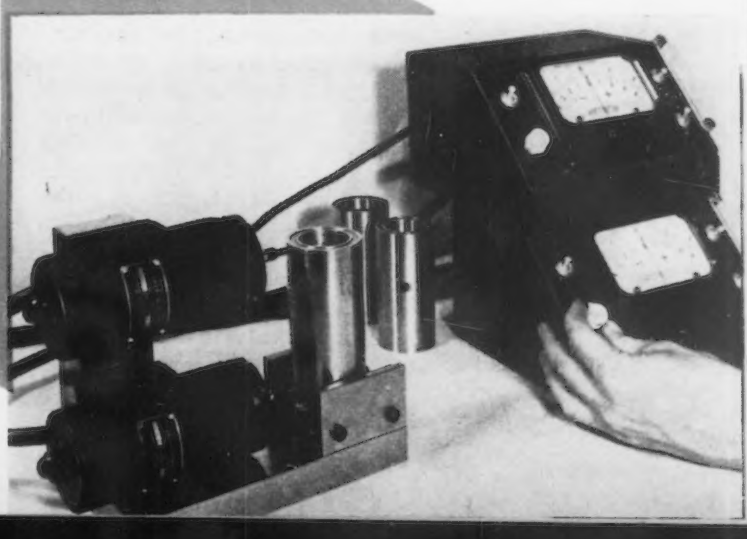

FIG. 4—Checking accuracy of master squares with "super" master square requires two comparator gages of the electronic type.

FIG. 5—The sine bar can be used for inspection of short run production. Here, a bevel gear is being tested with a sine bar and a precision surface plate that was substituted for a master flat.

of arc. Such means are indispensable for periodically checking components of specialized instruments such as comparator gage anvils or conventional measuring devices as tool makers' squares and numerous other items in the modern plant. For maximum efficiency, the master square should be sleeve-like with a substantial wall thickness and measure 4 in. long x 2 in. diam. The original precision of a master square may be maintained for a long time if both ends are marked so the same one is used until it shows signs of inaccuracy in comparison with the unused end. Shop-made master squares, and there are some very accurate ones, are not truly *masters* if the dual comparator gage setup shown in fig. 4 is accepted as one of the few scientific means devised to micro-check the straightness of the instrument.

The sine bar takes over where and when the vernier type of bevel protractor must leave off, because the setting or verifying of angles, bevels and tapers in terms of 1/12th of a degree is positive only when determined with a sine bar. Formerly rated as laboratory equipment, the sine bar eventually had to follow gage blocks in their in-

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FIG. 6—Having set the sine bar to the required angle, with the proper gage block combination, the measurement is reproduced for quantity inspection.

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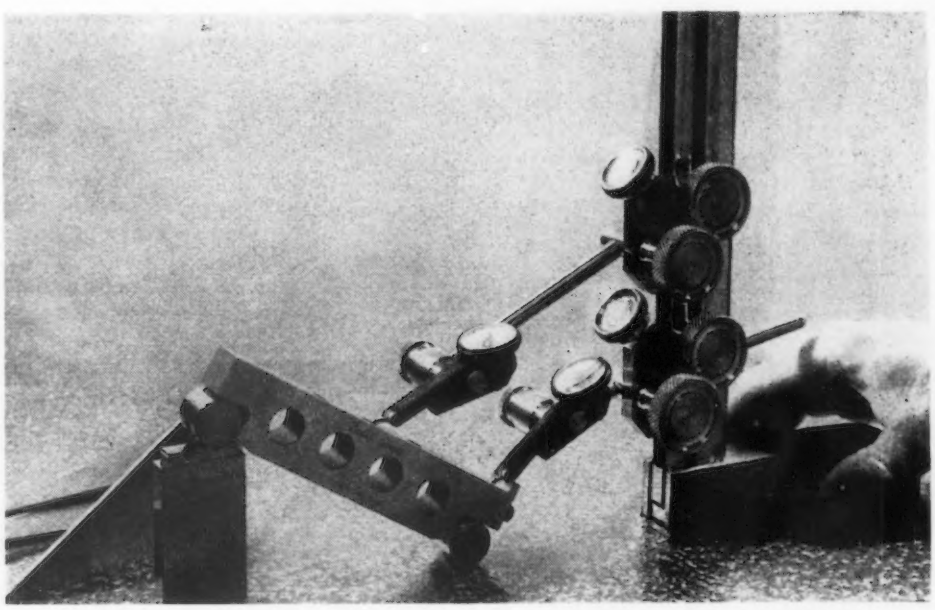


blocks and related instruments, its accuracy should be maintained and extended by diverting all measurement applications possible to a high precision surface plate. However, because of the eventual dire results of starting extremely fine measurements from a plane that is not optically true, the need for a master flat and its possible range of applications cannot be ignored. Two of its most frequent and practical uses are in connection with the master square and sine bar shown respectively in figs. 2 and 3.

The master square and master flat combine to provide a 90° angle that is accurate within 5 sec

vasion of modern production lines. As previously stated, it is worthless without gage blocks and is most effective only when used in connection with a master flat. The style, shape or length of a sine bar is immaterial, as these are subject to identical use and principle so it leaves accuracy as the only important factor.

There are shop-made sine bars, the precision of which compares favorably with that of shop-made master squares. The fact remains that the sine bar is the *master* of the vernier protractor and is therefore subject to some established standards of precision. A widely used design of

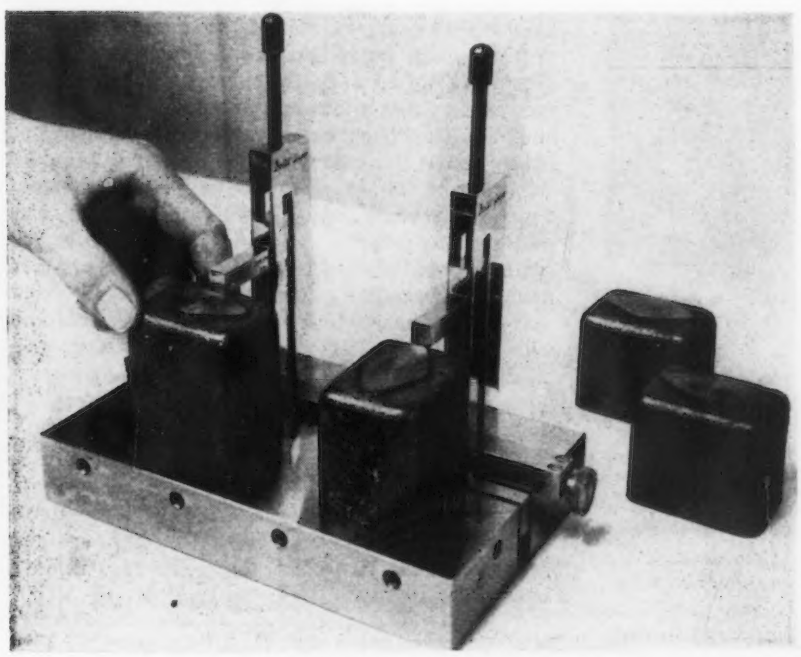
sine bar, shown in fig. 3, is 5½ in. long with centers of rolls 5 in. apart. The face of bar is parallel to the bottom of the rolls within 0.000025 in., flatness is within 0.000050 in. between the 5 in. dimension, and the nominal size between the centers of the rolls is ±0.000050 in.

Mention of the sine bar naturally brings to mind the reducing of all angles to terms of a right triangle. This is the simplest of all trigonometrical solutions, but still out of line with the relatively more comprehensible data on the use of gage blocks and other accessories. However, the most common problem encountered by the tool or die maker, machinist and floor inspector is to determine or check an angle between the hypotenuse and the base. This is where the sine bar, and simple trigonometric formulae available in most books on machine shop practice, simplify matters tremendously.

A right triangle consists of three sides, the hypotenuse, base and perpendicular or altitude. The sine bar is always the hypotenuse of a right triangle and the length of this side is therefore always a known number, which in this case is 5 in. Knowing the height, or readily determining it by building a gage block combination to equal it, the angle is readily solved. Tables of sines of the 5 in. bar, or longer ones, are in terms of the height or the side. Figures giving the corresponding angle of a known height or perpendicular only have to be reversed to determine the perpendicular or side of a known angle.

Since the sine bar and master flat form a combination for highly precise measurement, their use as with the master square should be reserved exclusively to find or verify the accuracy of angles in terms of a few micro-inches. For the inspection of parts in quantities, this form of measurement would serve only as a *master* to locate and clamp a parallel bar to a precision angle face plate and this assembly would in turn be transferred to a surface plate. However, the sine bar is often used on a surface plate for the inspection of short production parts, as in fig. 5.

There are parts encountered in the course of precision inspection which, because of bosses, projections and other factors of interference, cannot directly be placed in a master flat or surface plate. These require the use of precision parallels, preferably of the master type. Most



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LEFT

FIG. 7 — This assembly consisting of an especially made base block, holders, caliper bars and proper gage block combinations, provides an economical setup to accelerate quantity inspection.

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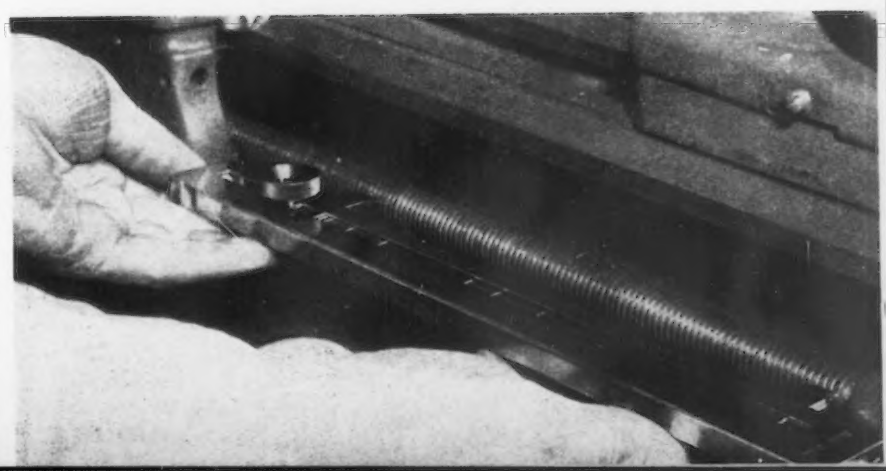

RIGHT

FIG. 8—The lead of this lathe screw thread can be checked in terms of microinches with an instrument readily made with 12 in. holder, the proper gage block combination and trammel points.

significant in the use of parallels is that they be precisely matched and permanently kept that way. Master parallels may vary in size, but flatness of the working surfaces should be within 0.000005 in. Working surfaces as represented by thickness and length with parallelism should be held within 0.000004 in. Variation in size should not exceed 0.000020 in. Because master parallels may be wrung to a master flat, in this respect they incorporate the same precision as gage blocks to adhere firmly and thereby minimize what could amount to substantially micro-inch height errors.

Comprising the second group of accessories, intended for instrument assemblies, are the following: Base block; adjustable holders, 2, 6, 9 and 12 in.; caliper bars, ⅞ in. and 3 in. extension; trammel points; center points; and scribers. The base block is not always used, but the adjustable holders are indispensable in connection with all other accessories mentioned.

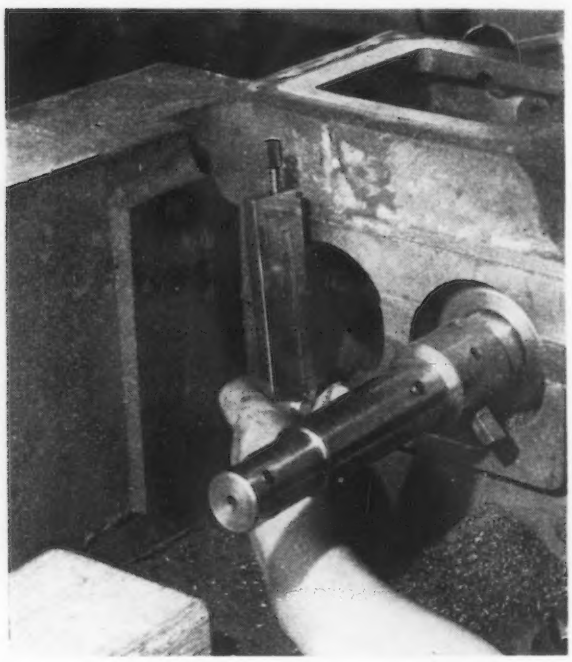

FIG. 9—The size of this bore in a casting is being verified with an internal gage made as that shown in fig 8, except for substituting trammel points with the short caliper blocks, which are intended for internal as well as external measurements.

Figs. 6, 7, 8 and 9 show several of hundreds of applications for this group of accessories to derive in excess of 100,000 measurements in steps of 0.0001 in. and within an accuracy not permissible by any other means.

Depending on the nature of the work involved, all accessories in this group are not always required, but their total cost is so reasonable that no item should be excluded. Briefly, there are several prime functions of the assemblies. A straight line may be drawn by using the base block, proper gage block combination and scriber in the proper gage block holder. Thus, parallel lines may be drawn by varying the gage block combination accordingly. Substituting the large or small caliper block for the scriber provides the height gage. Substituting the other mating caliper block for the base block provides a *Go* or *No-Go* snap gage. Likewise, a *Go* and *No-Go* can be made by combining the long and short caliper blocks into one holder. Substituting the center points for the caliper blocks provides the fastest and most accurate means to check screw threads. Arcs or circles of micro-inch precision can be drawn by a center point and scriber assembly, with similar precision applying to the use of trammel points for layouts.

The effectiveness of these accessories can better be realized with a knowledge of their respective specifications as compared to that of the gage blocks.

Base Blocks:	Nominal thickness of 1 in. held to ±0.000025 in. Flatness of top surface held to ±0.000005 in. and bottom surface to ±0.000010 in.
Holders:	Secured to base block by means of single point bearing to prevent misalignment of blocks.
Caliper Bars:	Flatness on width held to ±0.000005 in.
Center Points, Trammel Points, and Scriber:	Flatness of the bottom surface held to ±0.000005 in. per in. of length and to ±0.000005 in. of total width.

It is obvious that when using a combination of gage blocks, the combined precision of all parts involved can be rendered worthless by improper handling or care of the blocks and improperly wringing them into combinations. These requirements although often repeated are not always put in practice. Cleanliness is the prime requisite. The blocks should always be wiped before using, preferably with clean chamois and carbon tetrachloride to remove the acid free petroleum jelly which should always be used to grease them after use. The measuring surfaces of the blocks should never be touched to avoid finger mark corrosion that is likely to increase the dimensions. The blocks should be carefully wiped with and placed on cleaning tissue previous to wringing.

No one ever discovered why gage blocks adhere with a force approximately six times that of atmospheric pressure when correctly wrung together. The soundest reason for the phenomenon appears to be molecular attraction and the subject even goes into electrons. The fact remains that it does happen.

The first step for wringing two blocks together is to have clean hands. Next, the surfaces to be joined should be wiped across the ball of the hand, which in the language of gage blocks, is called *oiling*. They are now ready to be wrung by grasping them at the ends between the thumb and forefinger of each hand; then contacting the surfaces to be wrung about ⅛ in. from the corners in the most parallel position possible. One of the blocks can now be slid forward in a continued parallel motion and a slight inward pressure until the gages are properly aligned. Block after block can thus be added by following these simple recommendations.

The author is grateful to the DoAll Co., for its cooperation in the preparation of this article.

Moly Mold Samples Increase Accuracy of Spectrographic Analysis

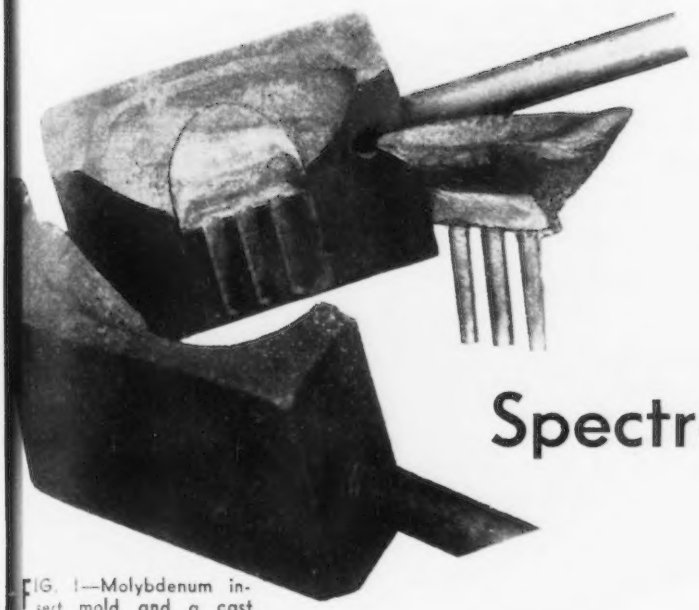

FIG. 1—Molybdenum insert mold and a cast sample of the type used for spectrographic analysis.

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The axiom that an analysis is only as good as the sample applies to any material — perhaps particularly to cast iron and cast steel. For these metals, the authors report that by casting samples in a molybdenum insert mold, spectrographic analytic deviations have been cut to as little as one-third of the variance experienced with samples from iron molds.

ONE of the most important problems in the routine spectrographic control analysis of cast iron and cast steel is the obtaining of representative samples. A recent advance toward the solution of this problem has been made at the Rouge Plant of Ford Motor Co. by the use of a molybdenum insert mold for the casting of rod samples for the laboratory.

Spectrographic samples obtained with this mold show a greater uniformity of structure, resulting in considerable improvement in the precision and accuracy of analytical results.

The original reason for the construction of the mold was the durability molybdenum showed as a mold material during nine months successful use in preparing furnace samples of stainless steels cast at full furnace temperatures.[1] However, as the test results were compiled, it became apparent that the improved quality of the sample was of equal or even greater importance than the life of the mold. It is not yet known why molybdenum is preeminently suited for use as a permanent mold material.

Numerous sampling techniques have been tried in the past. A technique in which the molten metal is drawn into a pyrex glass tube by means of suction has been successfully employed for some time at Ford for sampling

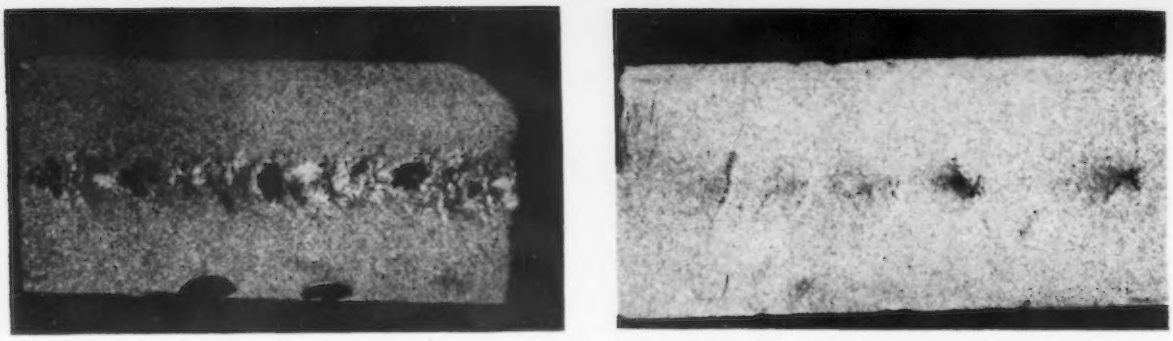


FIG. 2—Photomacrographs of longitudinal sections of pin samples showing the comparative shrinkage. The piece showing heavy shrinkage (at left) was cast in a standard iron mold and the other in the molybdenum mold. Nital etch; 6X; reduced a half in reproduction.

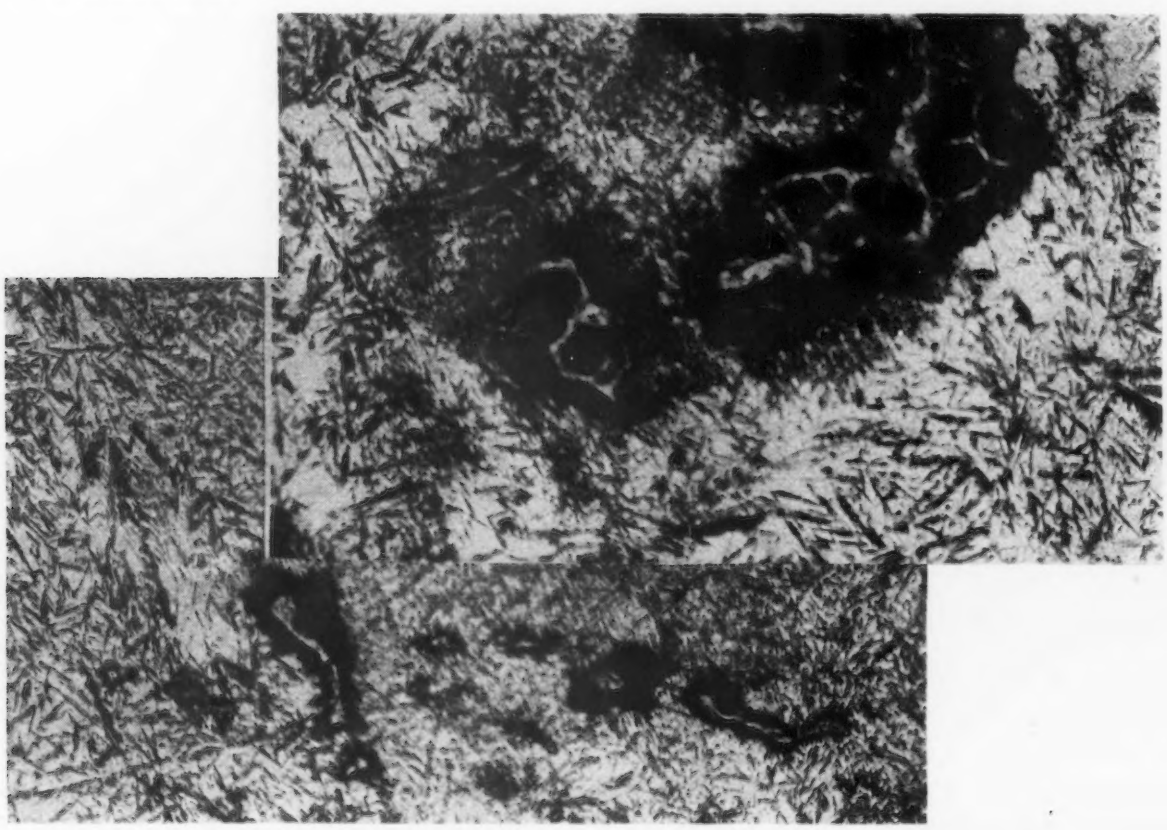
alloy steels for spectrographic analysis. But this practice has not been satisfactory for sampling cast iron and cast steels of high carbon content, as in casting such samples at full furnace temperature, a layer of glass often fuses to the pin and results in silicon contamination and impaired electrical conductivity. Also, it has proved difficult to obtain samples on a routine basis with uniform structure. Sand molds and cast iron molds have been used quite extensively, but have afforded only a compromise to the problem.

The new mold is designed to provide a pure molybdenum metal insert into which the molten metal flows in the casting process. Vacuum-melted and cast molybdenum metal is now being produced experimentally by the Climax Molybdenum Co. of Michigan, which supplied the material for the test mold. Fig. 1 shows a view of the mold with the molybdenum insert after about a thousand samples had been taken. A cast sample with the three pencil rods used for spectrographic analysis is shown in the photograph. The body of the test mold was reworked to receive the molybdenum insert.

Figs. 2 and 3 have been taken from a metallographic report comparing longitudinal sections of typical samples cast in the conventional cast iron mold and in the molybdenum mold. The photomacrographs show a comparison of the extent of shrinkage found in the two types of samples, and the photomicrographs illustrate the finer and more uniform grain structure of the samples cast in molybdenum. This improvement in structure was further substantiated in radiographs of a number of cast pins from each type of mold.

The improvement in the general structure

FIG. 3—Photomicrographs show comparative martensitic structures. The sample with heavy shrinkage (top sample) was cast in an iron mold and the sample with light shrinkage (lower specimen) in the molybdenum mold. Nital etch; 1000X.



and uniformity of samples cast in the molybdenum mold results in a pronounced improvement in the precision and accuracy of spectrographic results. One specific test involved the spectrographic analysis of phosphorus in cast iron.[2] A number of samples containing 0.045 pct P were obtained both from a cast iron mold and from the new molybdenum mold. The sample from a cast iron mold, when analyzed 15 times, showed an average deviation of 0.006 pct P, with a maximum deviation of 0.015 pct P. A sample cast in the molybdenum mold and analyzed under the same conditions showed an average deviation of 0.002 pct P, with a maximum deviation of 0.005 pct P, or about one-third that experienced with samples from a cast iron mold.

Acknowledgement is made to V. Crosby, Climax Molybdenum Co. of Michigan, for suggesting the use of molybdenum permanent molds and for furnishing the material for the original test mold.

At the time of this report, over 2000 samples have been cast in the molybdenum mold with no appreciable change in the physical appearance of the mold or the quality of the cast samples. It is believed that the life of such a mold will be far in excess of that obtained with conventional types, especially when used for samples cast at full furnace temperature.

Additional tests and extended applications of molybdenum molds for casting samples are being made. Although the cost of the experimental cast molybdenum is somewhat higher than standard mold materials, the improved sampling and the extended life of the molybdenum mold are expected to more than compensate for the initial cost.

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[1] Private communication from V. Crosby, Climax Molybdenum Co. of Michigan.

[2] F. R. Bryan and G. A. Nahstoll, "Industrial Application of Geiger-Muller Counters to the Analysis of Phosphorus in Steels," J. Optical Soc. of America, 38, 510-17 (1948).

Measuring Creep with Strain Gages

MEASUREMENT of creep in test specimens by means of SR-4 bonded resistance wire strain gages rather than the conventional extensometer gives simple, accurate and sensitive measurements, according to a report of the Canadian Bureau of Mines.

Gages can be applied to more than one area of the specimen, and, in some instances, permit the use of test pieces of more convenient dimensions than required in extensometer measurements.

Experimental tests, all at room temperature, were made with two type A-3 gages made by Baldwin Locomotive Works, bonded longitudinally on opposite sides of the gage length of specimens. The specimens were machined from sand castings of a magnesium alloy, and had an overall length of 12 in., parallel gage length of 10 in. and a diameter of 0.505 in. Conventional lever arm creep machines were used.

Strain gage measurements were checked against a mechanical extensometer system, and comparative data by the two methods are graphed in the elongation-time curves in fig. 1. Discrepancies between the two curves were attributed to movement of adapters in the extensometer during test. The fact that the discrepancies were approximately constant in terms of percent elongation supports this conclusion. It should be noted that the strain gage data make a smoother curve than that obtained with the extensometer.

Room temperature variation was not under rigid control, but the fluctuation was less than ±3.5° from 70°F.

Creep loads of 6500 to 15,000 psi were applied gradually over a period of several minutes, elongation readings being taken immediately before and after applying the load in order to establish the initial deformation. Tests lasted 1000 hr and periodic readings were recorded to define strain vs time or creep curves. In some instances pre-stress loads were applied after equilibrium conditions were reached in the creep machine. These loads were applied gradually over a period of several minutes and then slowly removed. Creep loads were applied immediately after removing the pre-stress loads.

Since the tests constitute only a preliminary

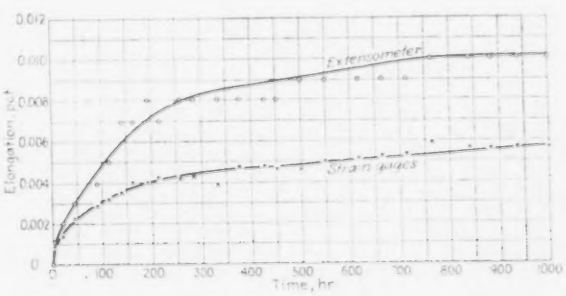

FIG. 1—Room temperature creep data taken with both SR-4 strain gages and an extensometer. Pre-stress was 9000 psi and creep load 6500 psi.

study, the report emphasizes that the data indicate only the possibility of using the gages for creep measurement and are not proof that room temperature creep can be measured under all conditions by this technique. Further experimental work is recommended to ascertain SR-4 strain gage behavior under conditions of constant stress at room temperature.

Gold and

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DESIGNERS have been attracted by the possibility of combining gold and chromium plates in the same part for some time. A number of nameplates, radiator ornaments for automobiles and similar parts have been done in gold and chrome by assembling two separately finished parts. The desired effect has been somewhat lost in breaking the piece into joined segments, however, and the cost of separate finishing and assembling has run quite high in comparison with one-piece work.

The designers of an automobile radiator ornament desired a one-piece diecast part plated in a combination of gold and chromium. A process, involving the masking of the area to be gold plated during the chromium deposition, was developed at the Holly, Mich., plant of Continental Die Casting Div. of F. L. Jacobs Co., with Bart Laboratories, Inc., Belleville, N. J., assisting in the development.

Since starting production, over 18,000 parts have been finished by the method and the technique has settled into a routine production-line process.

The established procedure for plating zinc base diecastings is followed through the bright nickel plating step. Castings are first polished to remove parting lines and surface imperfections and are then automatically buffed on reciprocating type machines. After inspection, the parts are racked and put through the following plating cycle:

(1) Soak in Dykasol solution, 40 sec at 140°F; (2) rinse; (3) pressure spray in mild alkaline cleaner, 2 oz per gal at 175°F, for 2 min; (4) rinse; (5) anodic electroclean in alkaline cleaner, 6 oz per gal, 30 sec, 180°F, 6 v; (6) double rinse; (7) acid dip in H_2SO_4, 3 pct by volume; (8) rinse; (9) copper strike, 1 min, 170°F, 4 v; (10) copper plate in du Pont High-Speed bath with

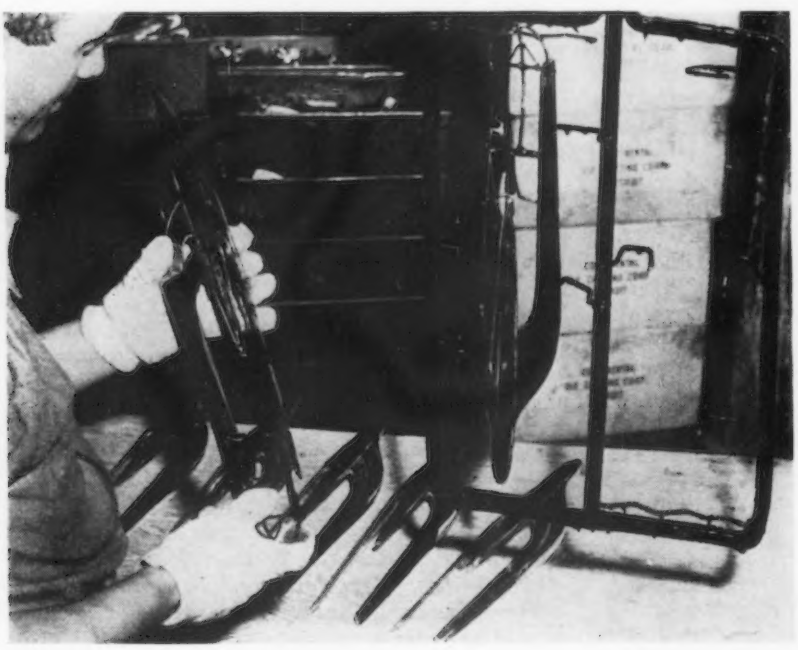

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FIG. 1—Metal and plastic masks, held securely in place by wire, are bridged across the area of the piece which will later be gold plated. The masks protect this area while the remainder of the surface is chrome plated.

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Chromium Combination Plating

A process for plating both gold and chromium on the same part, to give a highly decorative two-color piece, is described by the author. The area of the base nickel plate to be gold plated is masked during chrome deposition. Then the entire part, unmasked, can be gold plated since the gold will adhere to the nickel surface but not to the sections already covered with chrome.

periodic current reversal, 180°F, 30 min at 30 amps per sq ft; (11) rinse; (12) anodic alkaline clean, 30 sec at 160°F, 6 v; (13) rinse; (14) acid dip in H_2SO_4, 10 pct by volume; (15) rinse; (16) bright nickel plate, 36 min, 150°F, 40 amps per sq ft; (17) double rinse.

Up to this point the process has followed the conventional procedure. Now, before chromium plating, the casting is carefully masked, with the metal and plastic fixture as shown in fig 1, to cover the area which will subsequently be gold plated. Then the process continues as follows: (18) Activate in NaCN solution cathodically; (19) rinse; (20) acid dip in H_2SO_4, 5 pct by volume; (21) rinse; (22) chrome plate in sulfate bath containing 40 oz per gal CrO_3, sulfate ratio 100 to 1, 110°F, 3 min at 100 amps per sq ft; (23) double rinse.

The mask is then removed and the part is carefully color buffed on the area which was masked. This is necessary to remove oxidation film from the nickel surface. The part is then ready for gold plating and the process continues: (24) Cathodic electroclean in nickel alkaline cleaner, 180°F, 5 oz per gal, 4 v, 45 sec; (25) rinse; (26) acid dip in H_2SO_4, 2 pct by volume; (27) rinse; (28) gold plate in potassium-gold cyanide bath, as shown in fig. 2; (29) double rinse.

After removal from the final rinse tanks the parts are carefully wiped with a soft cloth to remove loosely adherent gold from the chromium plated surface. The gold surface of the part is sprayed with a clear baking enamel, as in fig. 3, and the casting is baked at 250°F for 45 min. As the final operation, the pieces are studded and packed for shipment.

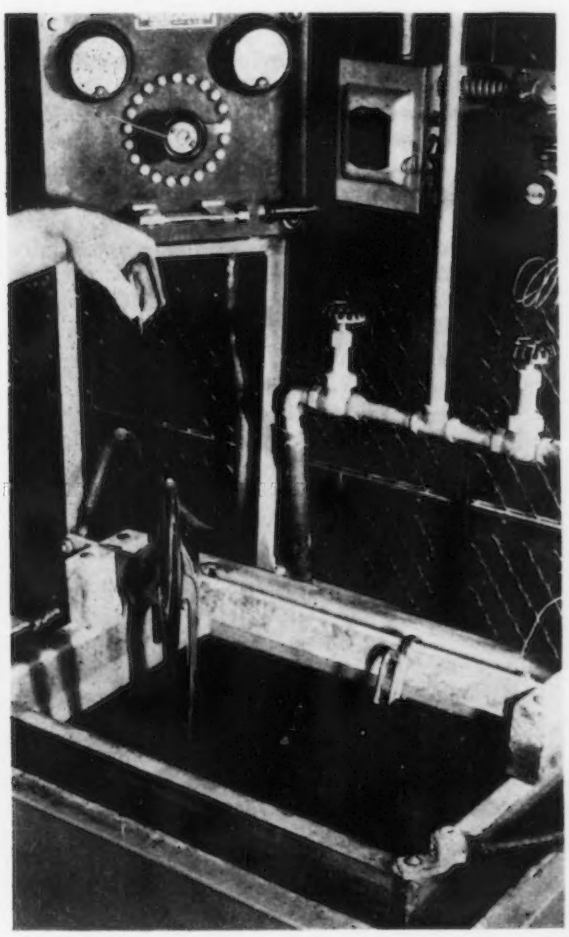
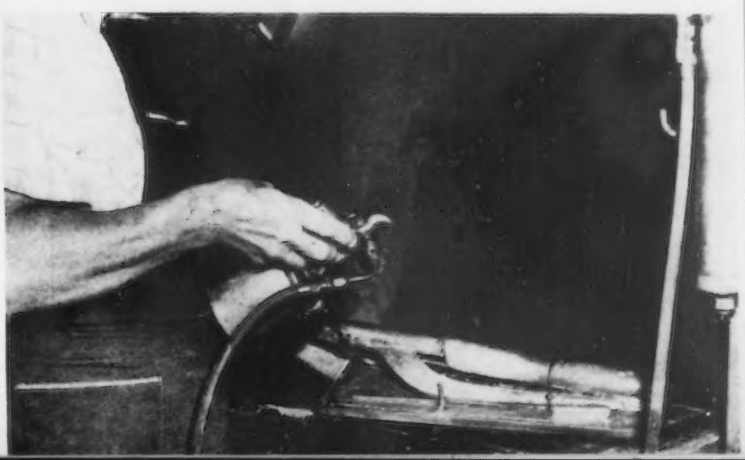


FIG. 2—Parts, with the masks removed, are gold plated. Gold will not adhere to the areas which have previously been chrome plated.

BELOW

FIG. 3—Gold plated portion of the part is sprayed with a clear enamel. Painting mask covers the chrome surface.



Colorimetric Determination of Copper

Details of a procedure for the rapid determination of copper in tin and lead base alloys are given by the author. The technique is reported to be faster than the commonly used methods, with single analyses requiring 20 min. The results of test runs on Bureau of Standards samples are summarized to demonstrate the precision of this method.

THE need of a rapid method for the determination of copper in tin and lead base alloys is of prime importance, as the commonly available methods are not both accurate and speedy.

Any procedure depending on a sulfide separation is too long and complex to be adopted as a routine procedure for laboratory technicians. The ASTM electrolytic method[1] where the tin, antimony and arsenic are volatilized by the use of hydrobromic-bromine mix, although an improvement over the methods using alkali sulfides, still suffers certain shortcomings. This second procedure cannot be used indiscriminately for the wide range of alloys the chemist has to analyze. In addition, the electrolytic determination is time consuming and only in special alloys does one plating yield a clean, bright copper plate suitable for weighing. Silver and bismuth if present will plate out with the copper, requiring corrections, and many times when antimony is high, the plate comes out dark and must be replated. For low amounts of copper a large sample, difficult to work with, must be used to obtain any degree of accuracy.

The nitric-HF procedure[1] for low lead alloys suffers from the same disadvantages as the hydrobromic-bromine method.

The colorimetric sodiumdiethyldithiocarbamate procedure for copper[2] seemed to offer the best possibility for a rapid procedure; and, working from it, a method has been developed by which determinations, as accurate as by any other standard procedures, can be carried out in about 20 min. The only elements other than copper which form colored compounds with the reagents are bismuth, iron, manganese, nickel and cobalt. Of these, manganese, nickel and cobalt are rarely found in the white metal alloys.

Manganese, if present, does not interfere in the ammoniacal citrate solution in which the determination is made. Nickel, if present, can be precipitated by a few drops of dimethygloxime solution before the addition of the color reagent and then centrifuged out. If cobalt is present in sufficient quantity to interfere, a sulfide separation can be made.

In the alloys, bismuth is commonly found both as an impurity and as an alloying element, and iron will often be present as an impurity. Iron, like manganese, does not interfere in ammoniacal citrate solution, and although bismuth forms a color similar to copper, the color is much less sensitive and under the conditions of the determination, bismuth under 0.50 pct will not affect the accuracy. If present in greater than this percentage, another aliquote to which KCN solution is added[3] is run along with the copper. The copper color will not develop in this medium and any color present will be due to bismuth so that the element can be corrected for.

Table I shows results obtained by the use of the method on U. S. Bureau of Standards sam-

TABLE I

Accuracy of Determinations by the Proposed Procedure on Bureau of Standards Specimens.

Sample	Sample Weight	Cu Present, Basis of 5g	Cu Found
53b	0.5g	0.209	0.21
			0.207
			0.21
	0.25	0.1045	0.107
			0.105
			0.11
	1.0	0.418	0.42
			0.42
			0.42
54a	0.5[1]	3.75	3.75
			3.78
			3.75
	0.1	0.75	0.76
			0.76
			0.75
127	0.5[2]	0.014	0.012
			0.012
			0.015

[1] Dilution to 500 ml and color developed on 2 ml portion.
[2] Color extracted from 25 ml portion with CCl_4.

in Tin and Lead Base Alloys

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ples of known percent copper. Table II gives instructions for the preparation of the required reagents.

Procedure

The proposed procedure for the determination is as follows:

(1) Transfer 0.5 g drillings or shavings of the sample to a 125 ml flask.

(2) Add 10 ml HBr-Br_2 mix and raise to a boil.

(3) Digest on moderate heat for about 2 min.

(4) Cautiously add 5 ml H_2SO_4 and take to strong fumes over a Meeker burner.

(5) Let stand until cool and add 25 ml cold H_2O. Raise to a boil and cool in running water to room temperature.

(6) Filter through filter paper containing pulp into a 100 ml volumetric flask. Wash out with cold water and dilute to the mark. Shake.

(7) Transfer exactly 5 ml to a 50 ml volumetric flask and add, in the following order, with shaking after each addition: 2 ml of 25 pct citric acid, 3 ml of NH_4OH, 5 ml of gum arabic solution and 10 ml of the sodiumdiethyldithiocarbamate solution. Dilute to the mark with water and read density or transmittance using a wavelength of 425 mu or a blue filter.

(8) Read percent copper from a standard chart prepared by standards from samples of known copper content.

(9) If bismuth is known to be present or is suspected, add the reagents, as in step (7) to another 5 ml portion, except that before the addition of the sodiumdiethyldithiocarbamate, 5 ml of the KCN solution are added. The density of this solution is then subtracted from that of the copper determination to obtain the true percent copper.

A more complete and rapid volatilization of the antimony, arsenic and tin results if the sample is digested prior to the addition of the H_2SO_4. For alloys containing over 50 pct Sn, it is best to digest the sample for about 10 min before the fuming is carried out, for if the volatilization is faulty, a cloudy solution might result when the color is developed. When cloudiness occurs, transfer another 5 ml portion to a separatory funnel, add the reagents as before, except that the gum arabic is omitted, and extract the copper with 50 ml CCl_4.

If the copper content of the sample is over 1.0 pct, either a smaller sample is used or the solution is diluted to a greater volume.

For copper less than 0.03 pct, develop the color on a 25 ml portion. Use 10 ml NH_4OH and omit the gum arabic. Extract with 25 ml of CCl_4 and divide the answer by ten.

Portions of the H_2SO_4 solution of the sample may be used for other determinations. Cadmium and zinc may be directly determined polarographically if there is less than ten times as much copper as cadmium or zinc. If the ratio of the copper to the impurities is too high, the bulk of the copper may then be plated out prior to the polarographic determination. Iron may be determined by the thioglycollic acid method[4], and aluminum by the thioglycollic acid and alizarin red S procedure[5]. In the iron and aluminum procedures, copper and other impurities that might be present will not interfere.

References

[1] ASTM Methods, Chemical Analysis of Metals (1946).
[2] T. Callan and J. A. R. Henderson, Analyst, 54,650 (1929).
[3] D. L. Drabkin, J. Assoc., Official Agr. Chemist, 22,320 (1939).
[4] M. Sherman, American Foundryman, 14, 6 (1948).
[5] To be published.

TABLE II

Preparation of Required Reagents

Hydrobromic-Bromine Mix—500 ml HBr and 50 ml Br_2.
Citric Acid—25 pct.
Ammonium Hydroxide—concentrated.
Sodiumdiethyldithiocarbamate—0.10 pct in H_2O. Keep in dark-colored bottle.
Potassium Cyanide solution—7 pct in H_2O.
Gum Arabic—To 1 g of powdered gum add 100 ml hot H_2O and boil while stirring until clear. Discard when precipitate forms on standing.
Carbon Tetrachloride—cp.

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FIG. 5—Cranes on the waterfront at Santos. Facilities at the ore handling ports will require expansion and modernization.

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Hills of I

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By RALPH VAILL
Consulting Engineer, New York

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FOR over a century Brazil has been very insistent as to her importance politically to the western world. Brazil feels herself a partner, in the full sense of the word, of the United States of North America in all hemispherical affairs and has a definite and well-defined conception of her international duty. If it is true that our western world is rushing into conflict with the other half of the globe, then the part that Brazil must play will be of vast importance. The pathway to Minas then becomes one of the western world's *must* undertakings.

Time does not permit the retreat of the American steel industry to the seaboard to meet a now source of iron ore. The ore must be brought to the furnace where they now exist. There are some signs that Brazil is conscious of the lateness of the hour in this respect. It behooves us of the northern continent to acquaint ourselves with the historical, ethnological, political and economical reasons behind the backwardness of Brazil. We must also seek out those elements in Brazil that are trying to make Brazilians more useful to themselves and to the world.

It can be stated without fear of successful contradiction that the most powerful element in Brazil is the Army, fig. 7. Without the complete and active cooperation of the Army the broad highway to the iron ore of Minas will not be built. Unless we are greatly mistaken, the main target of this Army is inside rather than outside of Brazil. The brains of this Army is preoccupied with the many and manifest problems of curbing the greed and selfishness of the rich, suppressing the crookedness and graft in government, and raising the level of the 40 million little people. One only needs to know such men as Gen. Oliveira, ex-president of Cia. Siderurgica Nacional, Col. Edmundo Soares, founder and builder of this same national steel company, Lt. Col. Bernhauser, Ibere de Mattos, Rui Almeida, and the aviation generals Antonio Appel Netto and Gervasio Duncan to realize where the hope of the future rests. Gen. Dutra, the president of the nation, in his slow and cautious manner, has in the two years of his government laid a sound and firm foundation despite tremendous odds and the incredible stupidity of the politicians.

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FIG. 6 — Brazil's rivers have played a major role in the development of the interior. Manganese ore is shown being mined on the banks of the Amapary.

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# of Hematite

In the second of three articles on the iron ores of Minas Gerais, Brazil, the author suggests that time does not permit the retreat of the U. S. steel industry to the seaboard. Outlining the problems that must be surmounted to reach the Brazilian ore, the author traces Brazilian political history, prefacing his remarks with the statement that the most powerful element in Brazil is the Army. The ore of Minas Gerais does not remain underground or undisturbed because of climate, soil or season, but because of land tenure.

A little study of that which goes forward today in Brazil will show the pressure of these younger men of the Army in overcoming the industrial and commercial lethargy that confronts the builder of the road to the ore. Col. Edmundo de Macedo Soares in 1946 and 1947 gave to the nation a definite and well conceived plan for the improvement of harbors, railroads and highways and showed his people clearly the staggering burden they must shoulder if they were to move forward at the speed the times demanded. He asked them to import $400 million worth of machinery. Previous to the Soares plan, a commission under the co-ordinator for S. A. affairs had published an estimate that Brazil must buy in the 10 years following the war, about $2 billion of industrial products in order to put the agriculture, industry and transport of Brazil in a condition that would permit the nation to convert, as it must, its potential into actual wealth.

Col. Bernhauser, writing in the Bulletin of the General Staff, arguing for these expenditures, explains to Brazilians what all of this means to them in terms of cotton, coffee, vegetable oils, woods, leathers and minerals that must be exported. Col. Ibere de Mattos, disgusted with the demagoguery of politicians, and the vulnerability of his people to the promises of Utopia if only the party in power be removed, exhorts them to get to work, take in the belt and seriously go about the business of "creating their own Utopia from the potential wealth in the soil and sub-soil of Brazil." He advocates that the Federal government create a drastic and novel financial setup where two kinds of money will exist—static and dynamic—the former to be limited as far as possible to the buying and selling of nonproductive items, the latter to be as great as possible and devoted solely to furtherance of productive enterprise. He cries for "more geologists and fewer agitators."

In the first part of this article, THE IRON AGE, *Dec. 16, 1948, the author discussed the occurrence and properties of the ores in the Minas Gerais region.—Ed.*

FIG. 7—In all matters, political and industrial, the Army in Brazil is supreme.

It is well to remember that Brazil, "this great amorphous, thinly populated territory, belonged to Portugal, a nation of 1½ million inhabitants, for 300 years and was thereafter an independent empire distraught by survival of these old colonial methods." It was beginning to achieve a sort of imperial unity about 1890 when the empire was succeeded by the Federal Republic. No nation has ever had a greater amount of regional diversities to hinder its economic development.

Thanks to the greatness of its Emperor, Dom Pedro II, these sectional differences never really threatened the dismemberment of Brazil. As Joao Pandia Cologeras said, "Great and noble was the task performed by the empire. At the beginning of the reign of Dom Pedro II, Brazil was obliged to face widespread threats of disintegration, and yet it remained united. Though they lasted two full decades, local troubles eventually succumbed to the cohesive power of the empire. Methods of government had passed through a striking evolution from absolutism to parliamentarism and while the latter was not theoretically perfect, its functioning, thanks to the emperor and his moderative power, was at least tolerable."

As the last days of this monarch dawned, and political fissures were appearing in the imperial edifice, the economic structure of Brazil, surprisingly, grew and expanded in a very pronounced way. From 1866 to 1880 foreign trade grew from $150 million to $200 million. The monetary situation of the country was sound. The population was over 9 million, of whom 1½ million were slaves. Immigration was increasing each year. Railroad mileage was multiplied five times. This, it should be remembered, was also the period of penetration into the forest of the "mousetrap," for it was in these years that the geologists and mineralogists really became aware of the value of the iron ore deposit in Minas. These are the normal fruits of stability and peace in a nation, and this was a period when political life in the average Latin American nation was most turbulent in their history.

Into this turbulency was born the Republic. It succeeded a monarchy ruled by an aristocracy remarkable for its democracy. Gilberto Freyre says, "As a political system, the Republic established in Brazil in 1889 remained, as the Empire had been, more imitative than creative. Honesty among public men decreased. There was also a decrease in the elegance and dignity that had become characteristic of the Brazilian Parliament in the days of Dom Pedro II.

"On the other hand, there was an increase in efficiency in practical matters. Some of the new political leaders were notable for their ability to deal with economic and sanitary problems which had been somewhat neglected by the Empire. And a few surrounded themselves with scientists and engineers who began to do really creative work. It was not until the establishment of the Republic that a series of courageous projects for harbors and wharves, water works, sanitation schemes, city paving, draining and beautifying began in Brazil. Brazil fell in love with material progress.

"In most of these plans one can detect the dynamic impatience of the Brazilians who entered public life with the Republic. It was at this point that Brazil went into debt on a great scale, borrowing the necessary gold from European bankers."

By 1930 this foreign debt amounted to nearly $2 billion. To service this debt, and to pay foreign investors in Brazilian enterprises the due return for their investments, this nation, which from the time of the beginning of this indebtedness had grown from 9 million to 30 million people, had to send abroad annually nearly $200 million.

In 1945, according to the statistics of the foreign department, 25 million cruzeiros of pig iron were exported. Twenty-six million cruzeiros of iron ore were exported, and 60 million cruzeiros of manganese ore went to foreign markets, or in other words, only a paltry $4 million was contributed by the mousetrap in

Minas. And this was a year when the world was famished for iron or manganese ore. In addition to the 16,000 tons that were exported, millions of tons could have found an eager market. In this same year, 14 million bags of coffee valued at more than $200 million, were exported. It required more than 2 billion coffee trees to grow this coffee. Incidentally, our Minas Gerais has produced over $60 million worth of coffee in a single year.

In order to gain an equal revenue from iron ore, over 12 million tons must be mined and exported annually. According to general shotgun estimates, there is enough iron ore there to permit doing that for the next 1000 years. At 10,000 tons per cargo, that would require about 1200 ships per year, or nearly 4 every day. Although some loading facilities are available, fig. 5, these would have to be modernized and expanded at the ports near the ore fields.

It would require, at 2000 tons per train, about 6000 trains per year, arriving at the docks. This ore would purchase nearly 25 million tons of coal, or enough coal, if coked, to make 30 million tons of pig iron. From 16,000 tons per year to 12 million tons per year is rather a jump, but it is a leap that has been in the process of evolution for quite some time.

Probably one of the best accelerators of the speed of this evolution was the crisis of 1930 which brought in its train a revolution that gave to Brazil for the next 15 years a dictator. The direct cause of this crisis was a catastrophic drop in the price of coffee in the world's markets at a time when there was a stock of over 26 billion bats in Sao Paulo, or more than enough to supply the world for one year. This great stock was the result of overproduction and a foolish government policy of holding surplus production out of the market by payment of subsidies in order to maintain a high sales price. At a time when Brazil could not service its foreign loans, it was still trying to borrow more money abroad in order to pay this subsidy. So great was the economic importance of coffee that practically every phase of Brazilian life was affected by the rise and fall in coffee prices. So great was the power of the State of Sao Paulo in national politics that the country was compelled to gear its economy to coffee from the day in 1905 when the famous "Valorization" plan was conceived.

Gilberto Freyre calls this "A plan that stands as one of the most original contributions of Portuguese America to the science of economics and to the then very vague technique of government control of markets."

At the time this plan was formulated, the president, Rodrigues Alves opposed it, thereby earning the hatred of the powerful Paulistas, but history showed that the attempts of government in price control only aggravated the ills they tried to remedy.

Cotton is increasing as a factor in national economy, especially in the business of textile export. The world war brought about production and found markets for other products, especially quartzite and vegetable oils. But until a capital goods industry is built here, and iron and steel produced to build roads, open new lands, etc., coffee and Paulista politicians will rule the roost. With this apparent need for a broader based economy, why does not this nation of intelligent people move further, faster?

Any superficial study of the history of the de-

FIG. 8—Deposits in the Itabira mines run as high as 69 pct iron.

velopment of the ethnic unity called Brazil seems to lead to the conclusion that more than forests and mountains have been required to maintain the inaccessibility to its great iron ore reserves. When the historical speed with which the coal, iron ore, oil and copper lands of the United States of North America were ravished is compared with the apparently eternal virginity of the mountains of Minas, it brings conviction that forces other than physical have delayed the violation. In the three centuries prior to its industrialization, the United States of North America developed politically at an amazing rate—as only Anglo-Saxon peoples seem to be able to do. Big business needs sound politics.

In that same period, Brazil was forced to preoccupy herself with the building of the ethnic rather than the political aspects of democracy, a task not yet finished. Brazil has never had the political stability necessary for establishment of great private or corporate enterprises, but Brazil is gaining day by day in its fight to be a great social and ethnic democracy. That species of democracy is one of the first impressions one gets on landing in Rio, and encountering its heterogeneous population living in a bewildering freedom from racial or color consciousness.

Brazil has been favored by some truly great diplomats. One of these, the Barão do Rio Branco, in his solution of a dispute with Bolivia over the territory of Acre, removed probably forever the threat of occupation, by powerful and all but sovereign chartered foreign companies, of great tracts of unused lands of weak nations in South America. This was a triumph for Brazil and a service to all South America. To this same great statesman should also be given credit for bringing Brazil probably forever to the side of the USA in all hemisphere problems. He carried the tradition of continental solidarity to its furthest limits. Brazil and the United States were allies in World War I and World War II.

To Barão do Rio Branco the Monroe Doctrine was as much the business of Brazil as of the United States and its enforcement a common duty, not in any respect unilateral.

This Brazil that the Barão do Rio Branco believed so passionately should have a voice equal to that of another in continental affairs has a geographical location which supports the thesis. We Americans point with pride to our 3000-mile undefended boundary with Canada as witness that we are a good neighbor. Brazil has 10,000 miles of boundary with ten neighboring countries and an historical heritage of boundary dispute that was fathered by nearly every European war of the 16th, 17th and 18th centuries. Is it any wonder that thoughtful Brazilians reserve the choice niches in their hall of fame for those foreign ministers of theirs whose labors in the past 150 years have finally brought peace, order, and understanding along this enormous frontier? When we of the North speak about "good neighbor policy," we deal in abstraction. When your backyard is 10,000 miles long and is for thousands of these miles only a vague line through jungles or over uninhabited mountains and your neighbors change rulers, parties, policies with amazing frequencies and suddenness, sometimes peacefully and other times violently—then good neighborliness becomes a very concrete thing.

Within the first century after the discovery of Brazil this race of pioneers was developed in Sao Paulo. The hardy Portuguese who settled in this section apparently lost no time in creating a second generation of halfbreed Portuguese and Indians to whom has been given the name of "Mameluco." Per se they were fighters. In bands of various strength, generally under the banner or bandeira of a purer blooded Portuguese (hence the name Bandeirante), they roamed the hinterlands of South America from the River Plate to the Amazon, even crossing the Andes into Peru in their feverish search for gold, and land and slaves. It was these men who found Minas Gerais in 1622 when, under Fernão Dias Paes Leme, they crossed the Mantiqueira just to have a look on the other side of the mountains and later, in 1633, by another group under Castanto Taques who found gold and named the land Minas Gerais de Cataguas.

Brazil is as broad as it is long, about 2600 miles in each direction at longest geometrical axis. It covers 4 hr in time. It has 8000 miles of what are classed as navigable rivers from a total length of 12,000 miles. In fact, for a long time the early settlers were able to penetrate inland only over these rivers and today much territory between is not even known to man. Fig. 6 shows manganese ore being mined on the banks of the River Amapary. One of the rivers, the Rio Sao Francisco, was probably the earliest of all pathways to the mountains of Minas. Its waters are formed by the diversion caused by the Serra do Espinhaco, the mountains of our ore lands. This river bulks largely in Brazilian historical and political development. As in the United States of America, the U. S. of Brazil did not always want to remain united. Here also the South tended always to pull away. This great north and south artery of traffic probably influenced the maintenance of union more than any other single factor. Once again today it comes into the national picture, as the next locality at which will be concentrated the energies of Federal government in an endeavor to industrialize, reclaim, and utilize the countless acres of the great basin from the Spine Range in Minas through the vast Sertoes of Bahia to the delta on the Atlantic in Alagoas. If ever an opportunity was offered to government to promote the general welfare, it would seem to exist here.

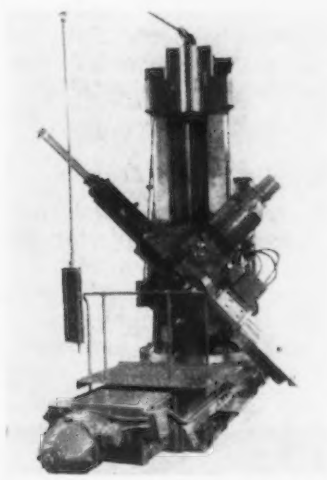
The ore of Minas Gerais, fig. 8, does not remain underground or undisturbed because of climate, soil or season. Back of all of this is the problem of land tenure. The ores will rest in peace, the ports remain unused, and a great proportion of the agricultural people of Brazil will wander in poverty over its millions of fertile acres, illiterate, diseased, ill-fed and clothed and practically un-housed until the lands of Brazil are given over to their use and they are made useful.

In the third and last article of this series, to appear in a subsequent issue, the author gives information on the cost factors involved in mining and shipping the Minas Gerais ores and, reporting on experience at Volta Redonda where the superb quality of the ore has been demonstrated, suggests that the excellence of the deposits may be the controlling factor in the development of the region.—Ed.

New Production Ideas . . .

A traveling head planer, surface grinders, deep drawing and tilting head hydraulic presses, a metal rolling machine, shears and a circular sawing machine, a hydraulic wheel press, alternators, an induction hardening machine, remelting furnaces, motors and magnetic starters, and a steel bath pyrometer are new machines and equipment described this week.

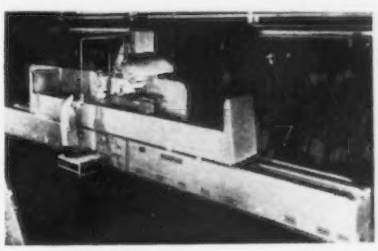
A NEW universal traveling head planer is arranged for shaping, planing, and slotting, and has a 65-in. cutting stroke with 48 in. of vertical feed on the column. The bed is 17 ft long providing 10 ft horizontal travel. The column will rotate 360° and the ram is adjustable 25° either way from the horizontal position. A 9-in. sq forged steel ram provides rigidity in heavy duty work. A 60-in. ram



bearing surface is provided in the saddle. The standard draw-cut shaper head has a 6-in. hand feed and uses 1½x2 in. cutting tools. Ac variable voltage motors and control equipment are provided. *Morton Mfg. Co. For more information, check No. 1 on the attached postcard.*

Heavy Duty Surface Grinder

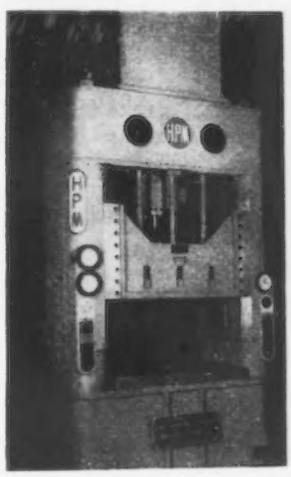
THE hydraulic-way grinder illustrated is a heavy duty machine with a 46-ft bed length and developed to grind the ways of large lathes. It is equipped with auxiliary vertical spindle for grinding safety gib, clamp surfaces and rack seats on the machine bed. Lathe bed ways are ground with the horizontal spindle having a grinding wheel trued to the proper angle for Vs and flats. The working capacity



of the horizontal spindle is 240 in. The column weighs over 10 tons. Operation is said to be easy with simplicity of control. Table speeds are variable between 10 to 100 fpm with single lever control. Hydraulic rapid traverse is 240 ipm and hydraulic wheel truing 6 ipm. The wheel head unit is powered with a 30 hp motor mounted directly on the wheel head. *Thompson Grinder Co. For more information, check No. 2 on the attached postcard.*

Metal Working Press

FOR rapid deep drawing and forming of sheet metal, a new 100-ton Fastraverse single action press has been designed. It is an all-hydraulic, self-contained unit with a 48x36-in. platen, 30-in. daylight and an 18-in. main ram travel. Located in the press bed is a 33-ton hydraulic die cushion with a 32x25-in. platen and 7-in. stroke. The press frame is a combination of castings and weldments that assure maximum strength and rigidity. The head incorporates the hydraulic cylinder with power ram that actuates the main slide. The press closes and opens at a rate of 770 ipm. It automatically reverses at a predetermined setting and slows down prior to die contact. Pressing speed under full load is 146 ipm. Operating on a 12-in. working stroke and building up 100 tons pressure on a solid surface, this press will cycle approximately 20 times per min. It is powered with a 40-hp electric motor. Operation is manual, semi-

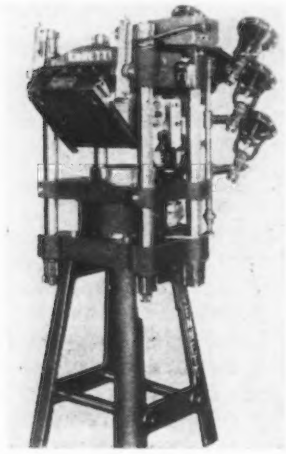


automatic or full automatic. *Hydraulic Press Mfg. Co. For more information, check No. 3 on the attached postcard.*

Hydraulic Press

THE tilting head hydraulic press, Model E-113, has been designed for applications requiring high-speed operation, accuracy of mold register, convenience of loading, and ease of stripping molded products. It is available in two sizes having platens of either 14x14 in. or 24x24 in., and may be supplied with heated platens. Construction features include bronze bushing guides on lower platen; annealed steel ram, cylinder and head

castings, and a self-contained packing cartridge that may be removed quickly. Operating speed is 3 sec, including opening or closing of mold and tilting head. The small press is stressed for a maximum pressure



of 3000 psi, 124-ton maximum, and the large press for a pressure of 2500 psi, 284-ton maximum. Pullback operation is by means of a telescopic ram located inside the main ram. Daylight opening on both presses is made to specification. Normal stroke is 2½ or 6 in. in the 14x14 size and 8 in. in the 24x24 size. *Emmett Machine & Mfg. Co., Inc. For more information, check No. 4 on the attached postcard.*

Squaring Shears

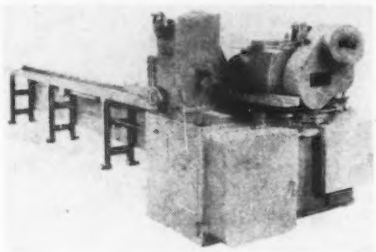
SIXTEEN-GAGE capacity foot squaring shears combine increased strength and rigidity with light weight and easy action. The bed, a rigid one piece weldment, and the deep crosshead, guided in flat bronze ways, give a solid nondeflecting support to the knives. A large, torsion-resisting, cross shaft assures equal motion on each end of the crosshead regardless of where pressure is applied to the full length non-slip treadle. These shears are available in 30, 36, 42, and 52-in. widths. *Niagara Machine & Tool Works. For more information, check No. 5 on the attached postcard.*

Industrial Seismograph

A PORTABLE seismograph for use in industry analyzes vibration problems on machinery and other equipment. It is a combination of a special seismic pendulum mounting. The Vibrograph embosses a permanent record of vibrations on a transparent film, recording over the range of 600 to 15,000 cycles per min and amplitudes as low as 0.0001 in. or as great as 1/16 in. Vibrations with a frequency as low as 120 cycles per min can be measured, even in swaying buildings where no steady reference point is available. *Westinghouse Electric Corp. For more information, check No. 6 on the attached postcard.*

Circular Sawing Machine

DEVELOPED to handle stock up to 4 -in. round or square, the No. O-H circular sawing machine is designed to hold cut-off pieces to close tolerances on either automatic or manual bar feed. Cut-off length is set on built-in scale, with micrometer adjustment, on the intake side of the machine. A hydraulic pump supplies pressure for automatic stock feed, stock clamping and head stock feed. All operations are sequenced hydraulically for safety



in tooling. The saw head has four blade speeds with a choice of speed ranges for ferrous and nonferrous metals. *Motch & Merryweather Machinery Co. For more information, check No. 7 on the attached postcard.*

Steel Bath Pyrometer

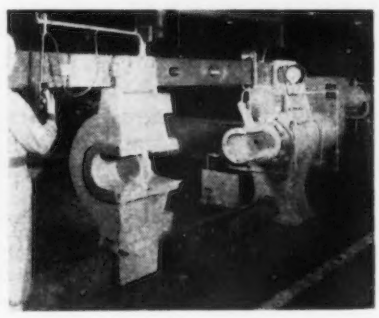
FOR high-speed measuring of molten steel temperature, a photo-electronic bath pyrometer has been developed that consists of an air-purged immersion tube having a photo-electric cell mounted at its rear end. An electronic indicating and recording unit with a scale and chart graduated 0 to 3100°F with approximately 12th-power graduations to correspond with the photocell output is a standard potentiometer modified to provide remote energizing of the balancing motor through the pushbutton on the immersion unit. The balancing motor is also energized when the standardizing button is depressed. The amplifying unit and the 24-hr chart-drive circuit are continuously energized, giving immediate response to temperature indication when the pushbutton on the purged sighting tube is depressed, and continuous indication of last temperature reading plus the exact time the temperature was taken. The recorder is usually located on the instrument panel for each furnace or on a separate panel that is visible to the operator when using the tube. *Brown Instrument Co. For more information, check No. 8 on the attached postcard.*

Heat Exchangers

REDESIGNED heat exchangers of the BCF type are announced as achieving the lowest cost per Btu transferred in diesels, gas engines, compressors, hydraulic machinery, blowers and other industrial applications. This line consists of shell and tube exchangers and is claimed to be equally effective in heat recovery, vapor condensing, and process heating applications. *Ross Heater & Mfg. Co. For more information, check No. 9 on the attached postcard.*

Hydraulic Wheel Presses

TO facilitate ease and speed in assembling or removing wheels, pulleys and gears, a new line of self-contained hydraulic wheel presses with capacities from 50 to 600 tons has been developed. A typical size has a 48-in. clearance



between bars, 128 in. maximum daylight, 24 in. ram travel, and daylight adjustments of 24-in. increments. The resistance yoke is equipped with a stop block for use in contacting the end of axles when mounting wheels and a throat block is provided on the end of the ram

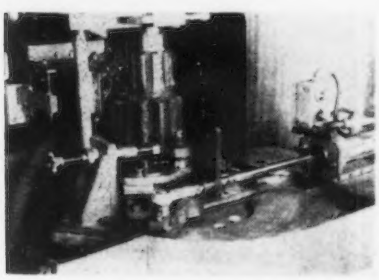
for clearing the axle when forcing on wheels. Remote push button operating control, mounted on a swinging arm, enables the operator to control the press ram movement at an advantageous position. The power unit is an HPM variable delivery, oil hydraulic pump with direct electric motor drive. *Hydraulic Press Mfg. Co. For more information, check No. 10 on the attached postcard.*

Cast Iron Electrode

FEATURING the 1949 formula Frigidarc flux coating, a new low temperature welding rod. EutecTrode 24/49 has been developed to produce strong bonds and high tensile welds that are machinable through the weld and the weld zone on both gray and alloy cast iron, without preheating. The electrode is applied at lowest currents to produce true low heat welds. It applies quickly and easily with ac or dc with either straight or reverse polarity. The EutecTrode 24/49 is available in 3/32, 1/8, and 5/32-in. diam. *Eutectic Welding Alloys Corp. For more information, check No. 11 on the attached postcard.*

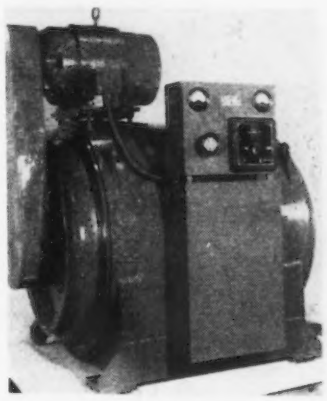
Induction Hardening Machine

AN automatic, heating, quenching and indexing unit for hardening gear teeth, one tooth at a time, by induction heating has been developed. Handling involves only the insertion and removal of gears. Gears that, because of their size, would require very large equipment to be hardened in one operation, can be done with 20 kw equipment and the use of this machine. Gears ranging from 20 in. diam with a 12 in. face or larger, depending upon generator capacity, are accommodated by this unit. Upon pressing the start button after the gear is inserted, each tooth of the gear is automatically heated, quenched and indexed until every tooth has been processed. Controls are contained in a cabinet attached to the unit. *Induction Heating Corp. For more information, check No. 12 on the attached postcard.*



Alternators

A NEW series of alternators permits a top capacity of 300 kw at 1800 rpm, 60 cycles. The machine is available at speeds of 720, 900, 1200 and 1800 rpm, with direct connected exciter on the high speed designs and top mounted exciters on the lower speeds. Rotors, mounted on sealed-for-life, cartridge-type bearings, are constructed with dampner windings to facilitate parallel operation. The stator is made of 26 gage, coated dynamo steel with 3/8 in. ventilating air space for each 3-in. of lamination stock. The voltage regulator control panel is mounted on top of the outlet cabinet. *Kato Engineering Co. For more information, check No. 13 on the attached postcard.*

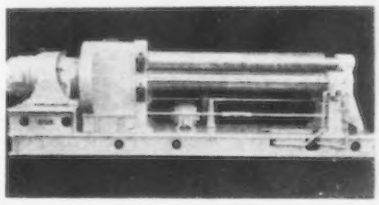


Pressure Reducing Valve

EMPLOYING internal pilot piston operated construction, a high pressure reducing valve is designed for steam, air or gas service, handling inlet steam pressures from 300 to 1500 psi and air or gas inlet pressures from 300 to 3000 psi. Reduced pressure range is from 100 to 600 psi. Maximum inlet temperature is 1000°F. Interchangeability of replacement parts makes a complete overhaul possible without removal of the main body from the pipe line. The main valve is hardened stainless steel with a hard faced seating surface. The valve is available in 1, 1¼, 1½, and 2-in. with Series 90 or 150 flanges or welding ends. *Leslie Co. For more information, check No. 14 on the attached postcard.*

Rolling Mill

A ROLLING machine for pipe, well casing and general metal rolling is a heavy duty unit of the three-roll initial type, capable of rolling heavy gage and alloy steels.



Rolls are forged of SAE 4140 alloy steel and gears are heat treated and hardened. The unit has a specially wound stator motor, which is a three-phase ac gearhead motor or variable speed slip-ring motor with separate gear box. The rear bearing on the top roll is available either with manual operation or automatic air cylinder operation. Sizes and lengths are manufactured to suit particular requirements. *Valley Foundry & Machine Works. For more information, check No. 15 on the attached postcard.*

Miniature Ball Bearing

MINIATURE ball bearings are now offered with small OD and large bore. The bearing is the full-race, radial-type with 15 balls 1 mm diam. All surfaces are precision finished and all tolerances are ABEC 5. The bearing is available in chromium alloy bearing steel and 440 stainless and weighs ¼ g. *Miniature Precision Bearings, Inc. For more information, check No. 16 on the attached postcard.*

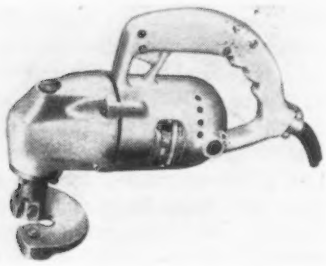
Magnetic Starters

A NEW line of ac magnetic starters has been designed for starting and protecting motors up to 50 hp. They are furnished in all NEMA sizes from 0 to 3 and contactors can be furnished in NEMA sizes from 00 through 3. A one-piece plastic-encased coil enclosure protects the windings against dirt, moisture, or possible damage during installation. Clamp-type coil terminals are firmly embedded in this enclosure to prevent loosening. Silver contacts are easy to inspect, interchange, and remove without the use of special tools. An asbestos arc shield prevents arc-over between contacts.

The silicon steel magnet has a permanent air gap in a non-wearing surface to insure quick dropout. Starters are either open or mounted in general purpose, watertight, dust-tight, or hazardous atmosphere enclosures. *General Electric Co. For more information, check No. 17 on the attached postcard.*

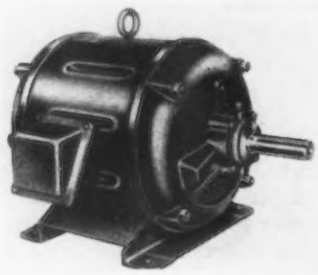
Shear

A NEW Porto-Shear will cut 12 gage standard sheet metal, approximately two gages thinner in Monel metal and stainless steel, and approximately 50 pct above the rating in sheet copper, aluminum, lead and other nonferrous metals. This portable shear will follow an irregular pattern because the cutting blade is visible and it will cut on a radius as small as 1½ in. A rapid reciprocating action of the vertical blade against the stationary horizontal blade makes a clean smooth cut without burrs or ragged edges on either piece. A universal motor delivers 1100 strokes per min at full load. The handle contains an instant-release trigger switch with locking pin for continuous use. *Black & Decker Mfg. Co. For more information, check No. 18 on the attached postcard.*



Polyphase Motors

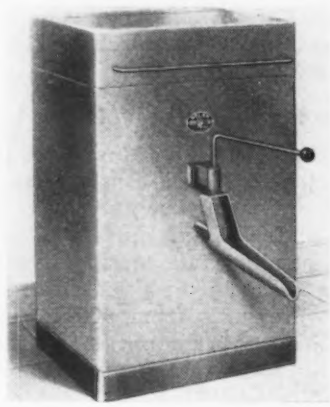
DRIP-PROOF design previously incorporated in Wagner motors in frames 225 and smaller has now been extended to include polyphase motors in the 254, 284, 324 and 326 frames. The new larger motors differ from the smaller only in the omission of ventilating openings. Because there are no frame openings these motors, available in both sleeve-bearing and ball-bearing design, are drip-proof in sidewall or ceiling horizontal positions when end plates are correctly rotated. Frames are formed of rolled steel shaped to center the stator core and to provide passages between the frame and core for ventilation. An auxiliary fan draws in air through the openings in the front end plate, forcing it through these passages and out through the endplate openings on the drive end.



Screens on endplate openings prevent material from being drawn into motor. *Wagner Electric Corp. For more information, check No. 19 on the attached postcard.*

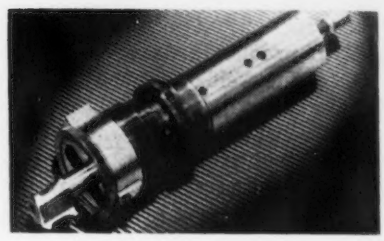
Remelting Furnace

NEW metal furnaces for remelting soft metals are available in the Model 2000 that has a 1-ton capacity metal pot and the Model 650 that has a 650-lb capacity pot. Both are equipped with hinged covers, ventilating pipe connections, bottom draw-off valves with swing spouts, and heating arrangements. They may be supplied without the bottom pouring valve for plants where hand ladling or pump casting is required. These furnaces may be equipped for heating by electricity or gas. Regularly furnished for temperatures up to 850°F, they may be arranged to give any necessary temperature range to meet special requirements. Automatic temperature control is optional. Larger pot sizes up to 5 tons can be furnished. *Nolan Corp. For more information, check No. 20 on the attached postcard.*



Recessing Tools

RECESS-O-MATIC recessing tools developed for use on multiple-spindle automatics can be attached quickly, and, for actuation, utilize a telescoping draw-bar that connects to the back of the machine. Work setup requires no cam change. Adjustment for locating recess is made in conjunction with the feed cycle of the cam, and adjustment for recess diameter is made on the tool itself with a micro-adjusting nut. Actuating mechanism of the tool reduces machine feed in a ratio of 2.75:1 to recess cutter. Recessing work of various diameters, up to capacity of each holder, is accomplished by the positioning of the cutter holding block in the tool, making it possible to work at extreme capacity of the tool without increasing cutter overhang. *Maxwell Co. For more information, check No. 21 on attached postcard.*



Rust Inhibitor

A RUST inhibiting action paint recently developed, is tough, resilient, colorless and can be used on all metals. The paint can be applied over treated or untreated, porous or nonporous, new, old or welded metal. When applied after scale is removed it is said to stop rust from creeping. When used as a primer, the product will anchor the finishing coat to the raw metal. It is reported to have withstood salt spray tests for over 200 hr. *Graham Co. For more information, check No. 22 on the attached postcard.*

Duplex Strainer

A DUPLEX strainer has been designed to handle fluids with a high solid content without the necessity of interrupting pipe line operation to clean the strainer. The units are suitable for intermittent or continuous flow. Flexibility of design permits the handling of sudden surges of solids. Flow through the unit is diverted from one strain-

Assembly Line . . .

WALTER G. PATTON

• Full details of Olds' new rocket engine are disclosed . . . Olds "76" has latest GM body . . . Fire halts Mercury assembly line.

DETROIT — One of the best yardsticks for measuring progress in automotive power plant design and performance became available last week when Oldsmobile gave out for the first time the full engineering details of its new "Rocket" engine.

Compared with the original Oldsmobile engine which powered the "Curved Dash" Oldsmobile models of 50 years ago, the new 1949 Rocket engine is 9 in. shorter in length and only 4 in. wider; yet it develops 19 times as much horsepower as its one cylinder, "7-horse" predecessor.

The new Olds engine (sometimes referred to as the Kettering high compression engine) develops 20 more horsepower than the 1948 in-line 8-cylinder engine. Operating at a compression ratio of 7.25 to 1, the engine will run without knocking on most premium fuels.

The engine is basically designed to permit a compression ratio of 12 to 1 with only minor changes in the present design. Olds engineers estimate that fuel efficiency will be improved 33 1/3 pct when the 12 to 1 ratio can be employed.

A short high carbon alloy steel crankshaft with five main bearings is used in the new engine. There are six counterweights.

Connecting rods feature I-beam construction and are made of heat-treated, drop-forged steel. Thrust surfaces are ground to close limits to insure a minimum amount of friction.

The pistons are a low-expansion type aluminum alloy, reinforced with steel struts. The new design features cutaway skirts that are automatically self-adjusting, minimizing "piston slap" normally occuring on a cold start.

New hydraulic valve lifters maintain zero clearance throughout the valve linkage, so that any lash that may develop is automatically taken up. An exceedingly fine precision job is required for the new type valve lifters which, it is understood, have to be assembled under oil.

In its 8-cylinder block Olds continues to use alloy iron. The new blocks are heavily ribbed to give additional rigidity and strength.

The cylinder head is the valve-in-head type. The bore is 3¾ in. and stroke is 3 7/16 in. Displacement is 303.73 cu in. Brake horsepower at 3600 rpm is 135.

The cylinder head is the valve-in-head type and the new combustion chamber is said to be cast to closer limits than ever before.

The new "Rocket" engine has 100 pct full pressure lubrication, a double-acting fuel pump and automatic spark control. The new carburetor is designed to operate without danger of vapor lock.

The battery of the new Olds is conveniently placed under the hood at the left side of the engine opening. The battery is 17 plate with 115 amp-hr capacity.

BY means of a slightly longer piston stroke, a larger bore and heavier crankshaft the six-cylinder engine which will power the series "76" has been boosted from a rating of 95 to 105 hp. The bore of this engine is 3 17/32 in. and stroke is 4⅜ in. Electro-hardened aluminum alloy pistons fitted with two compression and two oil control rings are specified. A single plate dry disc clutch is used and the car is equipped with Syncro-Mesh transmission.

The under hood battery is 15-plate, 100 amp-hr capacity. Both the Futuramic "76" and Futuramic "98" use quadri-coil springs, with knee action front suspension and heavy coil springs in the rear. The cars have 4-way stabilization through dual stabilizing arms, front and rear ride stabilizers and a lateral stabilizer at the rear.

Steering is dual center-control, worm-and-double-roller design. The "98" will have 191.7 sq in. of brake lining area compared with 159.8 sq in. for the "76" series. 7.10 x 15 low pressure balloon tires are used on the "76" and 7.60 x 15 low pressure balloon tires are specified for the "98".

The wheelbase of the larger car is 125 in. compared with 119½ for the "76" model. The additional line of cars Olds is expected to introduce during January will be equipped with the 8-cylinder "Rocket" engine.

WITH the introduction of the Olds "76", the public had its first look at the new General Motors A-type body.

There is more leg room for both front and rear seat passengers and additional cross-wise seating room in front and rear.

Glass area of the windshield is increased 28.5 pct. The windshield is also higher and is curved in such a way as not to distort vision through its entire range. Following the radius of the windshield, the driver's line of vision passes through the glass at approximately the same angle at either end as it does straight ahead.

The front pillars of the new body are set back appreciably. These pillars have also been slenderized and have their narrowest profile in line with the driver's vision. The rear glass area has also been increased. Safety-plate glass is used all around.

In the new bodies, the rear seat is moved forward 18½ in. ahead of the center line of the rear axle.

WHEELABRATOR

makes cleaning dollars go farther . . . for small foundries too

The remarkable economies of "Wheelabrator" airless abrasive blast cleaning are not restricted to large installations. Of the more than 5,000 Wheelabrators now in use, a great number are in small foundries, some pouring as little as two or three tons daily. Yet even in operations of this scale, the right Wheelabrator for the job proves profitable. Let's let these foundry case histories speak for themselves:

1 cupola — 2 tons daily — $20.00 a day savings are being realized by Craftools, London, Ont. with their 27" x 36" Wheelabrator Tumblast which is cleaning grey iron castings.

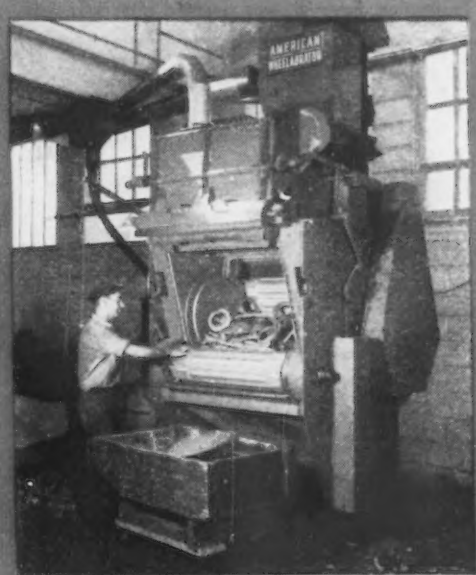
1 cupola — 4 tons daily — When a 36" x 42" Wheelabrator Tumblast was installed at Hillsdale Foundry Co., Hillsdale, Mich., it faced a two-week accumulation of uncleaned castings. Half of this was Wheelabrated the first day and the owner said the machine turned out more and better work than they could have done in a week with the two tumbling mills formerly used. He was surprised at the quietness and cleanliness of the machine and said it was the best investment he had ever made.

2 cupolas — 6 to 8 tons daily — "We believe we are probably the smallest shop employing the Wheelabrator (a 36" x 42" Tumblast) as we have only the capacity for about fifteen molders on light work, but we were forced to use the Wheelabrator because our big competitors offer this finish and in order to compete we had to be able to give it. We feel that we have definitely improved our competitive position in the industry by being able to offer the customer a Wheelabrated finish without having it cost us a great deal of money." Hirshheimer Foundry, LaCrosse, Wis.

These same advantages can be yours. To help you in the selection of the right machine for the job, the services of American engineers are at your disposal. In the meantime write for Catalog 74-A "The Airless Wheelabrator, What It Is — What It Will Do."

66" Wheelabrator Swing Table at Arneson Foundry, Inc., Kenosha, Wis., "cleans castings with annealing scale better and faster," in the words of their superintendent.

The ever popular 27" x 36" Wheelabrator Tumblast . . . a 5 cu. ft. mill . . . cleans 200 pound loads of gray iron castings in 4 minutes at Marrin Foundry Co., Minneapolis.



American

WHEELABRATOR & EQUIPMENT CORP.

510 S. Byrkit Street — Mishawaka 3, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

Through the use of a new zig-zag type spring for the front seat, leg room for the rear seat passengers has been increased nearly 2 in. The design of the new spring provides greater clearance over the floor, making possible the increased leg room.

A new ball and roller type front seat adjuster permits freer range of movement of the front seat up to 4⅜ in.

New push-button type door handles are specified. It is not necessary to twist the handle which is designed for a natural grip of the hand. The doors open by a slight pressure of the thumb.

The size of the baggage compartment lid opening has been increased. A new type of spring-loaded hinge is used which performs both the counter-balancing and hold-open function.

The storage compartment lid is equipped with a toggle-action slam-type lock. When the lid is closed it locks automatically. When the key is turned, the locking bolt is disengaged from the striker and the handle serves merely as a grip for lifting the lid.

Instrument panels have been completely redesigned with the instruments grouped directly in front of the steering wheel. The wheel is designed to permit unobstructed view of all instruments. The clock has been taken off the glove compartment door and placed in the center of the instrument panel.

The bumper and grille of the new cars have been redesigned and a new emblem is mounted on the hood.

Most motorists may find difficulty distinguishing between the "98" and the "76". There are no apparent differences in fender, windshield and front end design of the two cars. There is slight difference in the rear quarter panel, however.

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Names New Board Members

Detroit

• • • **Automotive** & Aviation Parts Mfgrs., Inc., Detroit, has elected five new members to its board of directors. Elected to a 3-year term are: L. M. Clegg, executive vice-pres. Thompson Products, Inc.; A. G. Drefs, president, McQuay-Norris Mfg. Co.; W. G. Hancock, president, McCord Corp.; D. H. Kelly, executive vice-president, The Electric Auto-Lite Co.; J. L. Myers, president, Cleveland Graphite Bronze Co.

Officers of AAPM for the coming year are: President, M. P. Ferguson, Bendix Aviation Corp.; vice-president, R. H. Daisley, Eaton Mfg. Co.; and secretary-treasurer, J. L. Myers, Cleveland Graphite Bronze Co.

Fire Halts Operations

• • • Following a $500,000 fire which completely halted Ford and Mercury production at the Rouge plant, assembly operations have been resumed on all but the Mercury line.

Normal Mercury production at the Deroit plant is expected to be resumed early in January. In the meantime output of the Detroit plant will be picked up by various assembly units in other parts of the country.

Curiously enough, a second fire in a Detroit auto plant occurred on the same day. The Brigg's Mfg. Co.'s automobile cushion conveyor was also badly damaged by fire. Production, however, was resumed after only a short delay.

Name New Wright Officers

New York

• • • **William C. Jordan,** vice-president and general manager of Wright Aeronautical Corp., the engine-building division of Curtiss-Wright Corp., and former general manager of the Curtiss-Wright Airplane Div., was elected president and director of both Curtiss-Wright and its subsidiary, Wright Aeronautical Corp., at meetings of directors of the two companies here recently.

Guy W. Vaughan, president of Curtiss-Wright since 1935 and president of Wright Aeronautical Corp. since 1930, and associated with the two companies for 25 years, was elected chairman of the board of Curtiss-Wright Corp. In addition, he retains the office of chairman of the board of Wright Aeronautical Corp.

Paul Shields, a director of Curtiss-Wright and senior partner of the investment banking firm of Shields & Co., was elected chairman of the executive committee.

The company's recent developments in the aviation field include two new type power plants—the compound engine and the gas turbine—the Curtiss-Wright flight simulator and further refinement of the reversible pitch propeller which permits the "braking" of aircraft in flight. It also has under way experimental work with rockets and with jet and turbo-jet propulsion units.

Will Examine Statistics

Middleton, Ohio

• • • **John T. Anderson,** manager of the Commercial Research Dept. of Armco's Market Development Div., has been appointed chairman of a project committee by the Census Advisory Board of the U. S. Dept. of Commerce.

The committee will examine all production statistics collected by the U. S. Census Bureau and prepare standards for future operation, in order to give these statistics maximum value for all users.

TINNERMAN
Speed Nut
SAVINGS STORIES

"Saved—$50,000 EQUIPMENT INVESTMENT ...Thanks to SPEED NUTS*"

REPORTS MR. GEO. W. McINTYRE,
Sales Engineer, Walway Co., Detroit, Mich.

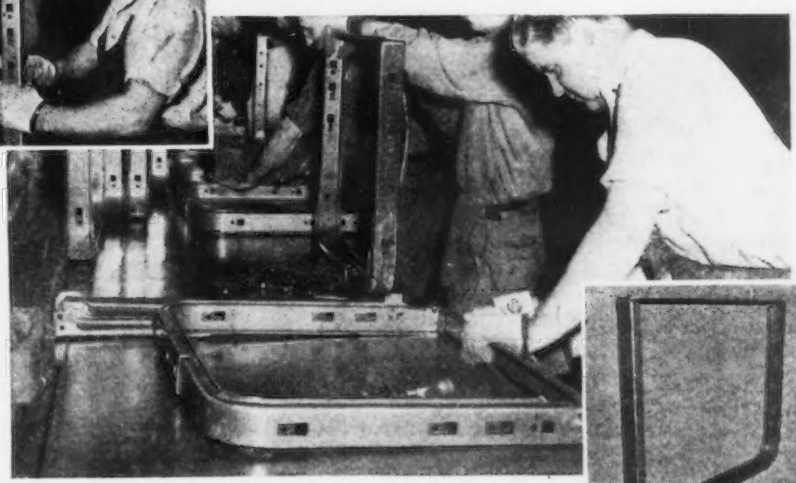
"Recently, a well-known automobile manufacturer asked us to estimate the cost of supplying radiator core supports for his 1949 models complete with welded nuts. Since we had no automatic welding equipment of the type required and were a considerable distance from the nearest source of high-voltage power, our investment in wiring and equipment would have been $50,000.00!

"With the help of Tinnerman engineers, we submitted an alternate estimate based on the use of heavy-duty, self-retaining 'U'-type SPEED NUTS. The customer accepted this proposal, gaining a 42.3% cost reduction over the welded-nut method . . . and saving the entire equipment investment."

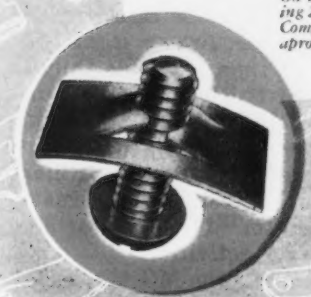
In analyzing your production costs, remember that SPEED NUTS can save money for you, too. Write for details on our Fastening Analysis Service or contact your Tinnerman representative, listed in major city telephone directories. Tinnerman Products, Inc., Cleveland 13, Ohio.

In Canada: Dominion Fasteners Limited, Hamilton
In England: Simmonds Aerocessories, Ltd., Treforest
In France: Aerocessoires Simmonds, S. A. Paris

Close-up shows heavy-duty "U"-type SPEED NUTS being slipped into bolt-receiving position by hand.



On the Walway assembly line, above, assemblers are attaching 21 "U"-type SPEED NUTS to each radiator core support. Completed product, right, is ready for final front fender, apron and radiator assembly.



TINNERMAN Speed Nuts
*Trade Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES

Washington . . .

EUGENE J. HARDY

• German steel and coal industry reorganization planned . . . Trustees will take over operation of industries . . . Economists see higher wages, lower profits.

WASHINGTON — Pending final peace settlements, the US-UK Military Governments are taking interim steps looking not only to the eventual return of industry to German ownership but by which it is expected that both the steel and coal industries may better carry out their share of recovery responsibility.

Under decisions recently announced through the State Dept., two initial major moves are underway. One is the setting up of a trustee system which, in effect, returns the assets, operational responsibility, and exercise of control to Germans—under close watch by MG. The other move is a reshuffling or reorganization program for breaking up the prewar pattern of wide ownership by cartels and combines.

However, these activities will not apply to those undertakings in the steel and coal industry in which half or more of the share capital as of Sept. 1, 1939, were owned by Allied interests.

The reorganization program for the two industries has the approval of the State Dept. It is pointed out that where ownership was set aside after the war because of identification with combines or Nazis, management was made responsible solely to the military government.

"It is thus impossible for such plants to secure loans for the purpose of rehabilitation and many of them have been operating at a financial loss which has been made up subsidies indirectly borne by the United States," says Secretary of State Marshall. "Hence, it was necessary in the interest of Europe to reorganize under a pattern which would permit responsible enterprises to be under at least a substantive or responsible ownership."

In effect, fulfillment of the MG decisions (United States Zone of Control Law No. 75) will result in regrouping of large combines and property which were forfeited into smaller self-sustaining units. These would be placed under German trusteeship which in turn would be responsible to the MG. Assets would be allocated among the various enterprises in such a way as to get them on a sound financial basis as soon as possible.

THERE is little difference in this and bankruptcy proceedings except that the MG is applying it in a large way to a complicated industry in a major world production center.

Those enterprises in the two industries which are not subject to the reorganization plans will shortly be released from MG control. Owners of the mines or plants will then be able to resume normal operation except that the US-UK Coal Control Group will retain the right to channel coal distribution.

As to the collieries, those which come under the reorganization plan will be withdrawn or taken out from the parent organization and set up as new companies. The MG will decide which assets are to be allocated and transferred to each of the new companies.

Three to five German nationals will be appointed as trustees for each new company and they will hold shares of the company in equal amounts. These shares, however, are merely held in trusteeship for the owners who will be entitled to their proportionate share of ultimate disposal proceeds but who have no voice in operations.

In the case of the iron and steel industry, a somewhat similar procedure will be followed but this will consist of two phases.

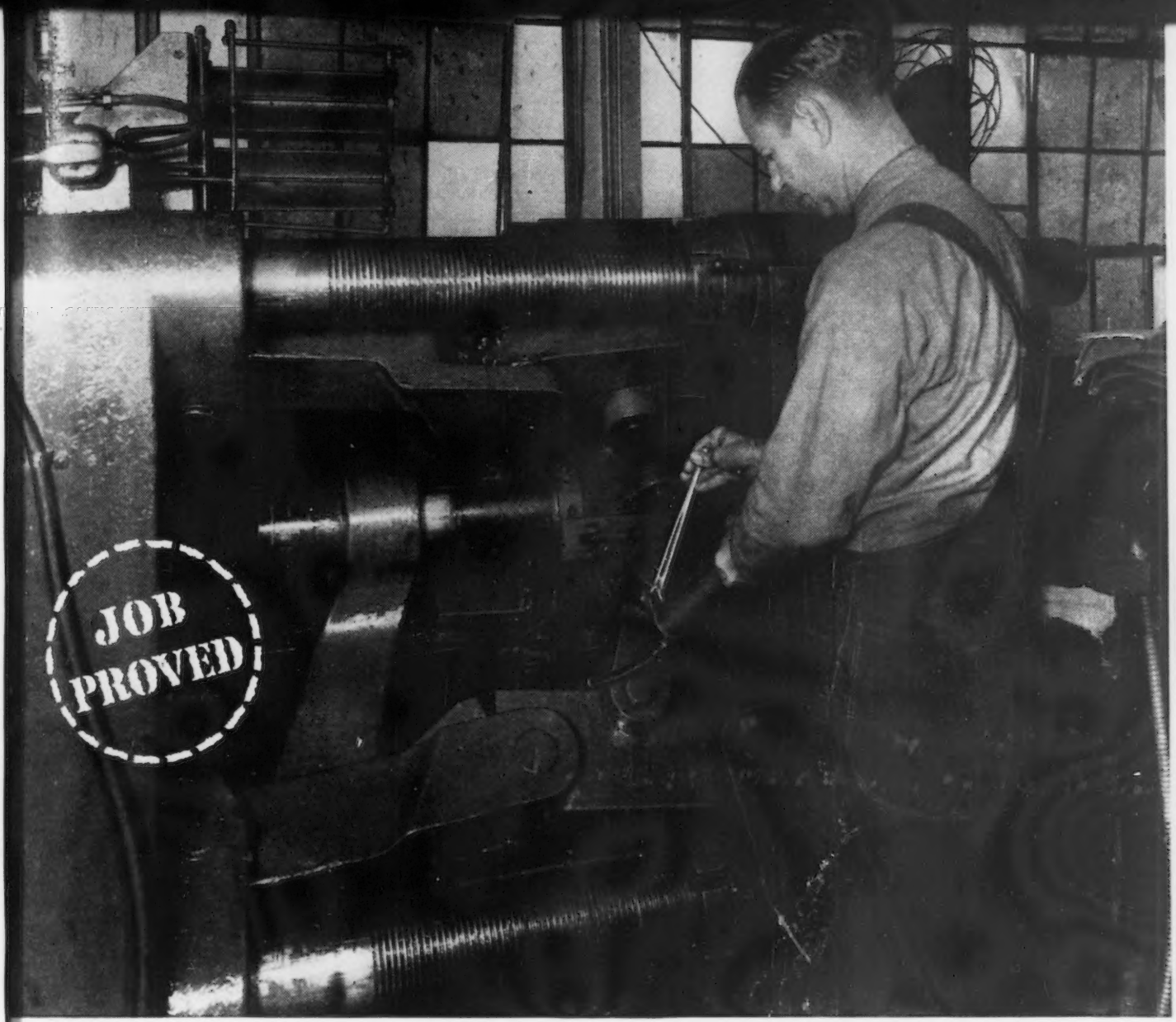
First, a steel trustee association consisting of 12 members will be appointed by MG in cooperation with the concerned German organizations. Shares and assets of the new companies which had already been formed to operate the steel-producing industry will be transferred to the association and the assets at present operated by such companies (including those held on lease) will be seized by MG and the title thereto transferred to the association.

LIKE the colliery set-up, the association will act as owners but will be prohibited from distribution of earnings or disposal of either shares or assets of any steel facilities. It is also subject to overriding authority of the MG through a Bipartite Steel Group agency.

When the new companies are formed, the second phase begins. As in the case of the collieries, trustees will be appointed for each of the new steel companies. The association will then take on the aspect of a trade association with a trustee from each plant being nominated as a member of the association. Powers of ownership, previously exercised by the association, now passes to the company trustees.

Carrying out of the program is likely to require a considerable period of time. For one thing, selection of trustees cannot be made hastily. In addition to obtaining competent persons, the MG will have to guard against returning to positions of control or ownership any persons formerly connected with Nazi activities.

Also, while the MG is committed to a policy of breaking up cartels



$300 SAVED IN "PIN" MONEY

Sun Lubricant Reduces Toggle Pin Wear 70% and Minimizes Shutdowns in Die-Casting Plant

In injection-molding zinc die castings, a manufacturer was experiencing excessive wear and breakage in toggle pins. The lubricant in use, which was applied to the pins by gun, just couldn't stand up under heavy-duty operation.

Asked for his advice, a Sun engineer recommended a grease which had been "Job Proved" in many machines of the same type. Over a period of 14 months, use of this Sun grease resulted in 70 percent reduction in breakage of pins. Translated into hard cash, this represented a $300 saving. In addition, costly shutdowns for pin replacement were greatly reduced.

Records like this are not unusual in plants where Sun "Job Proved" greases and oils are used. You can rely on these lubricants to help keep equipment operating steadily and safely, with minimum time-out for maintenance. For the booklet "What Makes a Good Grease," write Dept. IA-12.

SUN OIL COMPANY • *Philadelphia 3, Pa.*

In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS SUNOCO

"JOB PROVED" IN INDUSTRY

and large combines, it has to move slowly lest the opposite effect be accomplished and would find itself in the position of having abetted and fostered socialism and nationalization and fostered the continental trend toward socialism and nationalization of industry.

THERE are almost as many opinions as to the treatment to be accorded business next year by the White House as there are White House advisers.

But if the prevailing views of Chairman Edwin G. Nourse, of the President's Council of Economic Advisers, prove to be dominant, business men can breathe easier—for the time being.

Dr. Nourse points out that business men became frightened immediately after the November elections with stories about "a New Deal, a new orgy of spending, the fat's in the fire as far as business is concerned."

"I don't think this is so," Dr. Nourse said recently in an address before a meeting of the Machinery and Allied Products Institute. "I think the President has made it clear through me, through James Webb (head of the Bureau of the Budget) and through Secretary Sawyer that we are not going to spend blithely and carelessly."

For one thing, President Truman definitely believes in a balanced budget, Dr. Nourse said. "He definitely thinks that spending should be tailored to the nation's income, and I can tell you that he is deeply concerned about our $250 billion debt," he added.

Dr. Nourse pointed out that President Truman's current economic dilemma consists of the prospect of huge expenditures for defense and foreign aid on one hand and an obligation to reduce spending on the other hand. And excessive spending, he predicted, will mean (1) deficit financing, (2) new and higher taxes, (3) controls.

In the same vein, Robert Nathan, economist, told the MAPI meeting that he did not believe controls would be necessary if defense and armament spending could be held to $15 billion and foreign aid spending to $4.5 billion. But if there is to be tax reduction, he said, "we may very well need controls." If there is to be no tax reduction at this time, there is similarly no need for controls, he continued.

Although he said he believed the "major inflationary forces" have now spent themselves, he added that he had no doubt that a fourth round of wage increases would get through because "there are no signs that business is going to cut prices voluntarily."

Labor is going to point to excessive profits, he said. "The level of profits should be around $15 billion instead of around $20 billion as they are now, he said. And the threat of excess profits legislation should lend substantial aid to the fourth round argument, he added.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Management Lists Major Financial Difficulties

New York

• • • **Eight current** financial problems are considered of major importance by American industry, according to a survey of 1200 executives representing companies of all sizes and types of industry. The survey was made to determine subjects for discussion at the annual meeting of the finance division of American Management Assn. in New York Jan. 20 and 21. They are:

(1) The increasing difficulty of finding sources of funds to replace worn-out equipment at today's inflated prices and to provide for expansion.

(2) Public misunderstanding of the true nature and size of profits under today's conditions, and the increased need for retention of earnings to provide for plant replacement or expansion.

(3) Provision of adequate depreciation reserves under current tax laws and rising costs.

(4) The economic and financial implications of the government defense programs and foreign aid, and of the trend of inflation.

(5) The probable form and effects of future taxation.

(6) Accurately planning and controlling inventories.

(7) Quality of management as a consideration in extending credit by individual companies.

(8) The uncertainty of the future trend of interest rates in view of predictions of a scarcity of capital and evidence of a trend toward debt financing.

No. 87 of a Series of Typical Installations

Sunbeam STEWART

THE BEST INDUSTRIAL FURNACES MADE

FOR HEAT TREATING LEAF SPRINGS

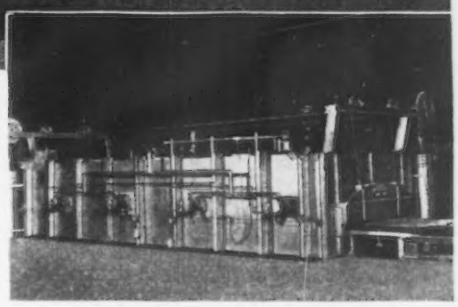
at Triangle Auto Spring Corporation, DuBois, Penna.

Discharge view of the Sunbeam Stewart Over-fired Draw Furnace used at Triangle. This unit is capable of accurately drawing 5000 lbs. per hr. All types of springs are manufactured from the smallest, 5 lbs. to the largest, 375 lbs. Usable heating space is 7" high x 6' wide x 28' long.

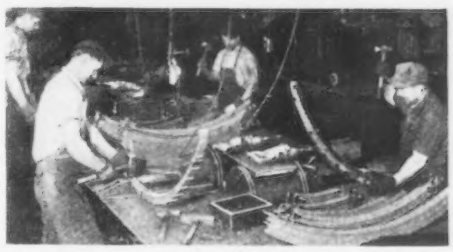
Capable of drawing 5000 lbs. of leaf springs per hour, Triangle's Sunbeam Stewart Over-fired Draw Furnace obtains the exact physical characteristics to meet their close specifications. Duplication of results is essential since each leaf plays a distinct part in the way the complete spring reacts.

Proper spacing of burners and the tangential firing along the roof, together with a correctly designed heating chamber, assure uniformity in heat treatment. The traveling hearth speed can be varied from 5.6 inches to 22.4 inches per minute in accordance with the size and thickness of leaf springs being processed.

This installation demonstrates the quality and sound engineering of Sunbeam Stewart Furnaces designed to meet the specific requirements of the metal-working industry throughout the United States. In addition, Sunbeam Stewart builds a full line of standard furnaces.



Charging end of Sunbeam Stewart Draw Furnace. Heat treatment at Triangle is so exacting that practically no variations are allowed.



Assembling spring leafs. Triangle makes all types—smallest, weighing 5 lbs. to largest, weighing 375 lbs.

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A letter, wire or 'phone call will promptly bring you information and details on SUNBEAM STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a SUNBEAM STEWART engineer will be glad to call and discuss your heat treating problems with you.

West Coast . . .

ROBERT T. REINHARDT

• Government owned metal plants on block . . . Douglas getting Pressed Metals Div. rolling . . . Kaiser breaks ground for new blast furnace . . . Aluminum shortage to become still more acute.

SAN FRANCISCO—There is considerable speculation as to whether the government will be successful in disposing of what many consider to be a valuable steel producing unit at Pittsburg, Calif., and a white elephant aluminum plant at Riverbank, Calif. through its latest offering.

Bids close Feb. 15 for the Pittsburg steel foundry which is now under lease to Pacific States Steel Corp. and operated by them to produce ingots for use at their Niles, Calif. rolling mills and for shipment to Inland Steel Co. This 5-ton electric furnace and two 25-ton openhearth operation was carried on under Columbia Steel Co. during the war and last May was leased by Pacific for 11 months with an option for renewal.

It is known that Pacific has expressed interest in continued operation but whether an offer to purchase has been made, has not been revealed.

The present operators expect to get as much as 400,000 tons of steel from the combined operations per year if sufficient scrap is available to maintain capacity.

Columbia has given no indication of renewed interest in this plant which is adjacent to their Pittsburg operations, but it is believed there will be no dearth of bidders for the unit which carries a "fair value" of $3,385,000 and which originally cost $8½ million.

There is certainly no sellers' market so far as aluminum reduction plants with a historic high operating cost and limited power available is concerned. The Riverbank plant built by Alcoa during the war is again up for sale with bids closing Jan. 10 and subject to control under the federal security clause which makes it mandatory that it be operated as an aluminum producer and not cannibalized.

Capacity of this unit is approximately 48,000 tons of aluminum pig per year and full operation demands a power supply of approximately 864,000,000 kw hr.

With power already short throughout the West it is inconceivable that a potential operator could negotiate a contract for that amount of electricity.

LOS ANGELES—With an eye cocked at the growing market for automobile parts in Los Angeles assembly plants of all major companies, Douglas Aircraft quietly has launched production in its new Western Pressed Metals Div. which is headed by former Convair chief Harry H. Woodhead.

Although Western's work thus far has been in the realm of small contracts with parts suppliers rather than with automotive companies, it has selected contracts which serve as pilot tryouts for various forms of automotive work.

With its tremendous facilities, including three large plants in different nearby cities, Douglas may move into position to handle body fabrication or at least major part construction as automotive companies in the Midwest make their assembly lines in southern California more self-sufficient.

Experts in pressed metals operations with imposing experience backgrounds in the automotive field are on Mr. Woodhead's staff. Whether these men will develop techniques to make it profitable to press out large body sections in the relatively small volume needed by West Coast assembly plants has been questioned. As inviting as it is, steel company officials in the West are inclined to believe they cannot look forward to such a sheet tonnage market locally because of the heavy investments necessary to produce large sections using present methods.

Although at the present time the Western Pressed Metals Div. is small, Douglas officials indicated that they could give the new unit 50 pct of their floor space if sufficient steel were available. A shortage of steel has been a definite handicap, although allotments from both Columbia and Kaiser have increased. Douglas expects more steel upon the completion of the Columbia mill at Los Angeles in about 2 years.

In one of the most significant pilot programs, Western has used Kirksite dies, similar to those used with aluminum for aircraft work, for the pressing of steel fenders and similar hard items.

Mr. Woodhead believes that he now has produced sufficient pieces to prove that Kirksite dies can be used successfully for steel, despite a general belief to the contrary. He has made metal stampings in quantity and at a reduced price with the aviation-type dies. The cost is 20 pct that of hard dies, he estimates, and greater speed is possible.

Some hard dies are used also by the company, but it now is pressing out successfully 10,000 fenders a month with Kirksite dies for California Parts & Supplies Co.

In the pilot process, Mr. Woodhead also is reeducating aviation personnel to the new functions in hard metal work.

Indicating the interest of the company, 70 pct of its work has been in the automotive field and 30 pct in such fields as plumbing (tubs and sinks)..metal furniture

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Reproduce your drawings on Ozalid papers in black, blue, red or sepia on white or tinted backgrounds. Color code prints for different departments . . . color code different circuits, dissimilar lines or symbols, etc. for greater clarity.

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DEPT. NO. 213

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Ozalid in Canada—Hughes Owens Co., Ltd., Montreal

and trailer parts. Stress has been on engineering development.

Western now is concentrated in the Santa Monica plant of Douglas with the El Segundo and Long Beach plants used for a major share of the Army and Navy aviation contracts of the company.

Describing his new project, Mr. Woodhead says: "It's a healthy baby. We are rolling, welding and pressing metal and have presses from 5000 tons to punch size."

•

Better Business Outlook

Los Angeles

• • • **Manufacturers** and distributors of machinery in this area are taking encouragement for additional business from the Nevada mining areas as a result of a survey recently completed by Henry Mulryan, chairman of the Chamber of Commerce's mining commission.

According to Mr. Mulryan, Nevada mines are "in an excellent position to profit by the current high prices of metals." He points out that in Nevada production of gold, silver, copper, lead and zinc totaled $30,404,175 in 1947 as compared to $27,026,416 in 1946. Recovery of miscellaneous metals increased the 1947 total to $35,400,000 which is about one pct above the 1946 level.

Copper production in 1947 was up 26 pct from $15,751,584 in 1946 to $19,915,610. Income from lead mining increased 37 pct from $1,564,150 to $2,140,360 while silver improved 12.3 pct from $1,010,526 to $1,135,685. A reduction in gold income of 3.8 pct from $3,173,800 to $3,052,000 was reported and zinc dropped 24 pct from $5,526,356 to $4,160,520.

Increased mechanization is apparent according to Mr. Mulryan who, on his 3000 mile trip, reported that high operating costs and labor shortages are responsible for this trend. He found greater emphasis on open-pit service operations.

•

More Pig From Fontana

Fontana, Calif.

• • • **A supply of** an additional 138,000 tons of hard-to-get pig iron came a little nearer to realization last week as Kaiser Co., Inc., broke ground for the second blast furnace and announced that this stack was scheduled for completion by the end of 1949.

This furnace and the new battery of 45 Koppers-Becker coke ovens were announced last September as a $17 million expansion program.

F. M. Rich, vice-president in charge of operations, and George B. McMeans, general superintendent, and their wives participated in the ground breaking ceremony.

•

Industries Still Coming

Portland

• • • **Reflecting a** continuing industrial growth by year's end, this city will be able to report the establishment of 150 new industries employing 1600 persons. Included in the project announced for the immediate future is the expansion of the Vancouver, Wash., plant of Aluminum Co. of America, at a cost of approximately $7 million. Approximately $1 million of this total will be used to remodel the present reduction plant and to install fume collecting devices and the remainder will be invested in a new unit to produce rods, bars and aluminum power transmission cable.

•

President Trouble-Shoots

Salt Lake City

• • • **Alden G. Roach** hardly had time to warm the chair in his San Francisco office as the new president of Columbia Steel Co. before he had to leave that city in the company of his vice-president and general sales manager, F. B. DeLong, in an effort to straighten out the complaints of local steel users.

Intermountain fabricators apparently are still unconvinced that their allotments from the Geneva plant are adequate and last week a meeting of the Utah Manufacturers Assn. included Col. Jack Singleton, chief engineer of the American Institute of Steel Construction, and John Griffiths, district engineer of AISC from Omaha.

Some digging into local information sources seems to indicate that steel fabricators are going to have a little difficulty in sustaining their claims that they are being bypassed. Reliable sources report that there is evidence to show that, on the whole, fabricators are getting as much or more steel as they indicated they might want before the U. S. Steel Corp. took over the Geneva plant.

o o o

SPEEDY CUTS: *This is the first of several high speed friction saws to be installed in U. S. Steel Supply Co. warehouses. A 60 in. blade that travels at 1750 rpm is designed to make square burrless cuts across heavy steel sections.*

o o o

Good News

for your BIGGER JOBS!

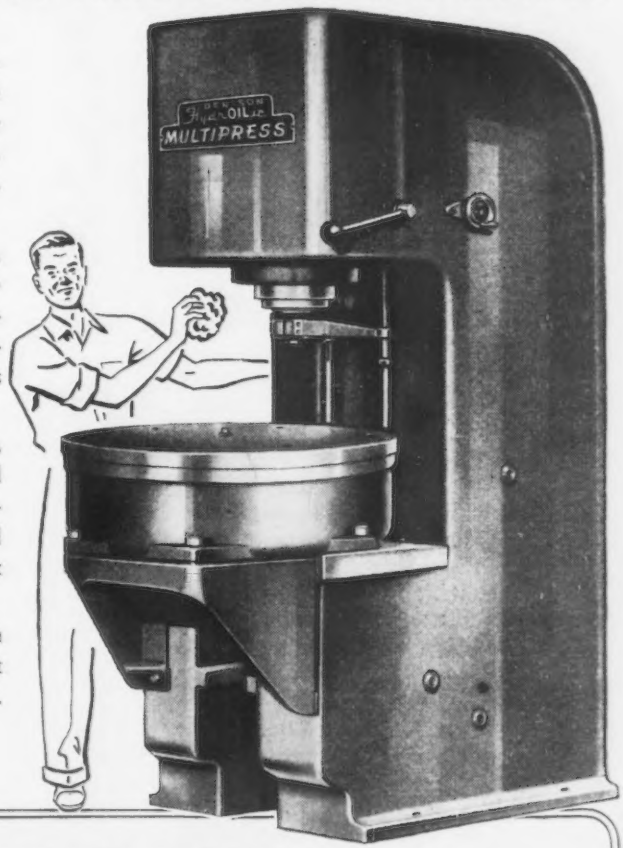
25-ton MULTIPRESS* brings all the cost-cutting, production-boosting features of the famous bench-size models.

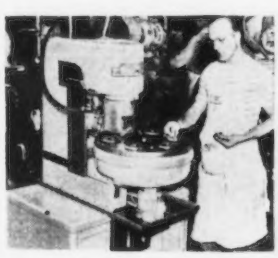
Now you can get *twenty-five tons* of the fast, oil-smooth production efficiency that has made the smaller, bench-size MULTIPRESS family so popular in industry. Its "feather touch" controls and quick, accurate, wide-range adjustability are ready to bring a full measure of cost-cutting, work-speeding MULTIPRESS action to your bigger jobs.

HIGHER PRODUCTION! Because you preset the stroke length, approach speed, pressing speed and pressure of the MULTIPRESS ram to the precise needs of each task, you get maximum operating efficiency—no waste motion. And the MULTIPRESS is *fast;* its ram delivers *controlled* power at speeds up to 530 ipm.

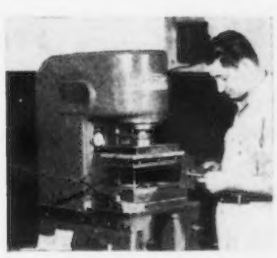
SAFE, EASY OPERATION! Easy-working hydraulic controls, operating at preset pressure limits through safe, dual hand levers, make this 25-ton MULTIPRESS simple to operate. Unskilled operators turn out production quality parts at full speed, right from the start. Adding the MULTIPRESS Index Table, or other feed devices, makes the job automatic!

Wherever you need up to 25-tons of speedy precision on jobs that call for 25-ton pressure application, you'll want to weigh the *many* proved advantages of MULTIPRESS. Write today for the full story!

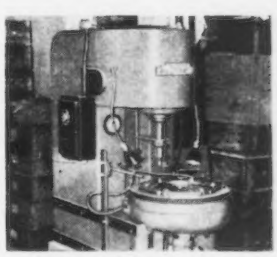




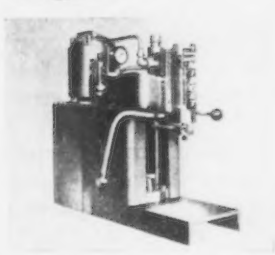
SERRATIONS are broached on small cams with this 4-ton Multipress. Parts are fed to the Multipress ram by the index table—a Multipress accessory—and pushed through cutting dies under the ram. This operator broaches 1600 cams per hour.



This 6-ton MULTIPRESS, equipped with electrically heated platens, performs a drawing operation on camera cases, and eliminates the need for presoaking the leather. Production rate is 18 to 20 cases per minute with a two-cavity die, manually operated.



Flash is trimmed from pipe plugs on this 8-ton Multipress with HydrOILic index table. On the kick press used before 6,000 blanks were trimmed in a day. Now, the Multipress operators produce 19,000 blanks a day.



The Multipress Midget—a one-ton high-speed, oil-smooth, hydraulic production tool—is ideal for small-parts work. Dual "feather touch" controls minimize fatigue, increase safety, speed production and improve quality.

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PERSONALS

o o o

• **Frank W. Bleiler** has been appointed assistant manager of sales, Milwaukee Spring Co., division of Illinois Coil Spring Co. in Milwaukee. Mr. Bleiler had formerly been connected with the Steel & Tube Div., Republic Steel Corp.

• **Robert L. Hartman** has been appointed production manager of Hanford Foundry Co., San Bernardino, Calif. Mr. Hartman had been associated with Utility Electric Steel Foundry for 14 years prior to joining Hanford. **Edwin C. Relph,** former production manager, has been named works manager.

• **William J. Healey** has been appointed superintendent of transportation at the Brier Hill works, Youngstown Sheet & Tube Co., Youngstown.

• **Howard E. Hornickel** has been made assistant superintendent of the zinc works of the American Steel & Wire Co. at Donora, Pa. **Jesse K. Miller** has been appointed works metallurgist succeeding Mr. Hornickel, which duties he performs in addition to those of his present position as works chemist.

• **J. Carlton Ward, Jr.,** has been elected chairman of the board of the Stratos Corp. of Farmingdale, N. Y. a wholly-owned subsidiary of Fairchild Engine & Airplane Corp. **Lawrence B. Richardson** has been named president of Stratos and **Myron B. Gordon,** vice-president. **F. Eugene Newbold, Jr.,** has been named general manager.

• **Walter H. Stellner** and **Elmer H. Wavering** have been named vice-presidents in charge of merchandising and in charge of product design, respectively, Motorola, Inc., Chicago.

• **Webb R. Phillips** has joined Larkin Transformer division of Larkin Lectro Products Corp., New York, as chief engineer. He had formerly been associated with R. E. Uptegraff Mfg. Co., Inc., Moloney Electric Co. and General Electric.

JOHN P. WILKINSON (left), assistant to the president and JAMES M. LEWIS (right), manager of roll sales, Lewis Foundry & Machine Div., Blaw-Knox Co.

• **John P. Wilkinson** has been appointed assistant to the president and **James M. Lewis,** manager of roll sales, Lewis Foundry & Machine division of Blaw-Knox Co., Pittsburgh. Mr. Wilkinson comes to Lewis Foundry & Machine from Mexico City where he recently supervised the installation of a new merchant mill for Aceros Nacionales. Mr. Lewis has been with Blaw-Knox since 1931 and has been connected with the roll industry for 25 years.

• **W. T. Scharfenaker** has been appointed superintendent of the brick mason department of the Midland Works, Crucible Steel Co. of America, Pittsburgh. He had formerly been connected with the South Works of Carnegie-Illinois Steel Corp., Chicago.

• **M. L. Douglas,** and **Foster E. Fike** have been elected to the board of directors of Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. **L. R. McWeeney** has been named vice-president and assistant secretary of the company. Mr. Douglas is manager of the plant at Coreopolis, Pa., Mr. Fike manager of the Rock Falls, Ill. plant and Mr. McWeeney is at the Port Chester plant.

• **Walter F. Schmid** has been appointed manager of the refrigeration department of the DeLaval Separator Co., New York.

• **Harald M. Olson** has been named consulting maintenance engineer for Morton Salt Co., Chicago.

• **Henry L. Marion, Edgar P. Dunlaevy** and **Weightman Edwards** have been elected vice-presidents of the Phelps Dodge Copper Products Corp., New York. Messrs. Dunlaevy and Edwards have been connected with the sales department of the corporation for many years. Mr. Brown has served as direct assistant to the president and in production control and coordination of operations.

• **Sydney Shuttleworth** has been appointed assistant to the president and director, Union Fork & Hoe Co., Columbus.

• **Robert L. Halsted** has been named manager of the Allis-Chalmers Cleveland district office, succeeding **Arthur H. Wyman,** who died. Mr. Halsted has been manager of the Allis - Chalmers Charleston office since 1942. **James Mathews,** Charleston sales representative, succeeds Mr. Halsted as Charleston manager. Mr. Mathews joined that office of the company in 1946.

• **Walter K. Benchley** has been appointed purchasing agent of the Hewitt Rubber division and **William A. Fleischman** has been named purchasing agent for the Restfoam division, Hewitt-Robins, Inc., Buffalo.

• **H. O. Williams** has been named vice-president in charge of foundry production of I. S. Spencer's Sons, Inc., Guilford, Conn. Mr. Williams has been connected with the foundry industry for the past 30 years.

Can Your Skeleton Use Tubular Bones?

Courtesy Cliffside Body Corporation

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WARREN H. WILLIAMS, Detroit district sales manager, Inland Steel Co.

• **Warren H. Williams** has been appointed district sales manager of the Detroit office of Inland Steel Company, succeeding **John H. Fitch,** who is retiring. Mr. Williams joined the company in 1935 as sales representative in Detroit and has been assistant district sales manager there since 1946. **Harris S. Currier** succeeds Mr. Williams as assistant district sales manager. Mr. Curier joined Inland in 1932 as mill representative in Detroit and in 1941 was appointed sales representative.

• **G. W. Merrefield** has been appointed consulting engineer to the foundry industry by the firm of Giffels & Vallet, Inc., Detroit. Mr. Merrefield served in similar positions with U. S. Steel Corp., Clark Equipment Co., American Radiator Co., and Chicago Hardware Foundry Co.

• **William A. Beatty,** has been appointed manager of the Feeder Div., Westinghouse Electric Corp., Pittsburgh. Mr. Beatty joined Westinghouse in 1916. He was appointed superintendent of the Feeder Div. in 1945 and became manager of manufacturing the following year. **Leonard H. Loufek** has been appointed industrial manager of the Central District for Westinghouse, succeeding C. H. Weaver. Mr. Loufek had formerly served as assistant industrial manager of the Central District.

• **Lee Cameron** has been elected president and general manager of Superweld Corp., Glendale, Calif. **Walter T. Wells,** who formerly served as president and general manager, has been named chairman of the board. **S. S. Webster, Jr.,** has been named secretary. **Robert E. Jones,** vice-president, has been elected treasurer. **Harold C. Hill** and **William M. West** have been elected directors.

• **Leroy W. Beier** has been named to represent Cannon Electric Development Co., of Los Angeles, in the Chicago area, including northern Indiana, northern Illinois and eastern Iowa.

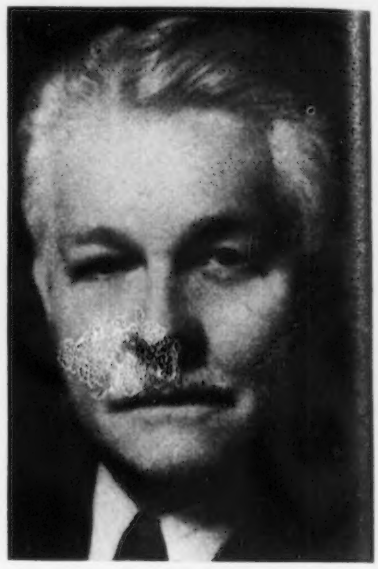
• **Alexander S. Moody,** commercial vice-president of General Electric Co., in charge of customer relations work in the northwestern states, with headquqarters in Portland, Ore., retired recently, after 42 years with the company.

• **Selden T. Williams,** vice-president of Scovill Mfg. Co., Inc., Brooklyn, has been appointed general manager of A. Schrader's Son Div. Mr. Williams joined A. Schrader's Son, Inc., in 1929 and in 1944 was appointed vice-president of the Scovill Company, in charge of manufacturing of Schrader domestic and foreign plants.

• **A. A. Bolik** has been appointed general sales manager of the Thunder Bay Mfg. Corp., Detroit. Mr. Bolik formerly had been associated with E. W. Bliss Co.

• **Russell L. White** and **Joseph J. Daniels** have been elected to the board of directors of E. C. Atkins & Co., Indianapolis, Ind.

• **Robert L. Reeves** has been appointed manager of store merchandising for the B. F. Goodrich Co., Akron, Ohio. Mr. Reeves has been manager of sales planning in the replacement tire sales division for the last two years. **Dale Kramer** has rejoined the company and has been assigned to the Auto and Home Supply department. Mr. Kramer has been connected with the company since 1933 and had been director of field sales personnel when given a leave of absence earlier this year.



FRANK G. LINCOLN, chairman of the board, Hy-Pro Tool Co.

• **Frank G. Lincoln** has been elected chairman of the board of the Hy-Pro Tool Co., New Bedford, Mass., a subsidiary of Continental Screw Co. Mr. Lincoln formerly served as vice-president in charge of sales of Morse Twist Drill & Machine Co.

• **John F. Marsellus** has been elected president of the Marsellus Casket Co., Inc., Syracuse, succeeding his father, **John C. Marsellus,** who has been made chairman of the board. **Richard W. Marsellus,** assistant treasurer, has been elected treasurer.

• **Robert T. Hazell** has been named vice-president of the Fruehauf Trailer Co. of Canada, Ltd., Toronto.

• **T. H. McConica, III,** has resigned from the magnesium division of Dow Chemical Co. Dr. McConica is devoting full time to his duties as manager of the American Ski Co., Clare, Mich.

• **D. M. House** has been transferred to the Los Angeles zone of the Pontiac Motor division of General Motors Corp., Pontiac, Mich., replacing **R. J. Cutri,** who has resigned. **L. H. Holmes,** manager of the Buffalo zone has been transferred to the Atlanta zone replacing Mr. House. **E. M. Krotine,** assistant manager of the New York zone, has been promoted to manager of the Buffalo zone, replacing Mr. Holmes.

A. W. PINGEL, industry manager, Industrial Parts Div., Reynolds Metals Co.

• **A. W. Pingel** has been appointed industry manager of the newly-formed Industrial Parts division Reynolds Metals Co., with offices at Plant 14, Louisville. Mr. Pingel formerly served as assistant sales manager for Revere Copper & Brass Inc. **John E. Wells** has been named special sales representative of the Industrial Parts division with headquarters in Reynolds Detroit office. Mr. Wells formerly had been associated with Avco Mfg. Corp.

• **Claude M. Lamb** has been appointed sales manager, Industrial V-Belt division and assistant to vice-president in charge of mechanical sales, Dayton Rubber Co., Dayton. **R. S. Gove** has been named to succeed Mr. Lamb as New York district sales manager. Mr. Gove has been a field representative, industrial division, in the New England territory.

• **Thomas C. Shreve** has been appointed consultant in the manufacturing field for McKinsey & Co., New York. Mr. Shreve's last positions were with K. W. Battery Co. and General Electric. Co.

• **Ray H. Stuff** has been appointed sales manager of the Nox-Sound division, Nox-Rust Chemical Corp., Chicago. Mr. Stuff had formerly served as sales manager of a specialized division of the A. O. Smith Corp.

• **Harry R. Lehman** has been appointed factory manger and **Joseph A. Nagelberg** has been made purchasing agent, Cribben & Sexton Co., Chicago. Mr. Lehman formerly served as vice-president of Adel Precision Products Corp., Burbank, Calif. Mr. Nagelberg joined the company in 1942 and has served as assistant purchasing agent since 1947.

• **Arthur R. Munson** has resigned as general sales manager of the Lisk-Savory Corp., and has been made a director and sales manager of the Lord-Taber Co., Inc., Canandaigua, N. Y.

• **Harry Crump** for the past year manager of cutting tool sales engineering, Carboloy Co., Inc., Detroit, has been named assistant to the sales manager. **J. S. Gillespie,** formerly in charge of wear parts sales engineering, has been appointed manager of tool and wear parts sales engineering, succeeding Mr. Crump. **A. F. Dobbrodt,** formerly special products sales engineer, has been advanced to manager of mining sales engineering.

• **Sigmund Salacinski** has been appointed manager of the metals department of the U. S. Foreign Corp., New York. He had formerly been associated with the Metal Export Co.

SIDNEY A. WHITT, vice-president of engineering, Cordley & Hayes

• **Sidney A. Whitt** has been named vice-president of engineering for Cordley & Hayes, New York. Mr. Whitt has been director of engineering for the company for the past four years, and had formerly been associated with Nash-Kelvinator Corp., Fedders Mfg. Co. and Baker Ice Machine Co.

• **Frank T. Settle** has been appointed field sales engineer for the Fred H. Schaub Engineering Co., Inc., Chicago.

OBITUARY...

• **Walter D. Monroe,** 59, founder and president, Chicago Steel Service Co., Chicago, died Nov. 30.

• **John N. Goddard,** 81, president, Conklin Tin Plate & Metal Co., Atlanta, died Dec. 9.

• **Howard P. Zeller,** vice-president, Jamison Coal & Coke Co., Greensburg, Pa., died Dec. 10.

• **Emmett N. Owens,** assistant chief inspector, Ensley Steel Works of the Tennessee Coal, Iron & Railroad Co., Birmingham, died Dec. 11.

• **A. L. Sonnhalter,** formerly vice-president, Crucible Steel Co. of America at Midland, Pa. died recently.

• **Edward M. Johnston,** 53, sales representative of the Ingersoll division, Borg-Warner Corp., Chicago, died recently.

• **John S. Oursler,** 80, retired vice-president, Carnegie Steel Co., Pittsburgh, died recently.

• **Charles T. Schwab,** 45, assistant to the vice-president, Midland Works, Crucible Steel Co. of America, Pittsburgh, died Dec. 11.

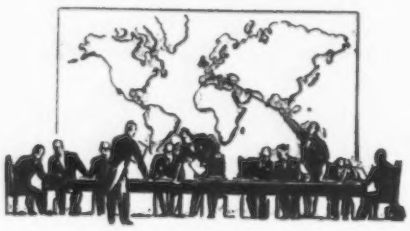
• **Benjamin E. Schwartz,** 52, senior member of the General Tinplate Co., Brooklyn, died Dec. 13.

• **Henry J. Hughes,** president, Robert Pinkerton Boiler Works, Green Island, N. Y., died recently.

• **Edward P. Dawes,** 48, production supervisor, Elmira Works, General Electric Co. at Elmira, N. Y., died recently.

European Letter . . .

• Cominform subverting Tito's regime from within . . . He faces complete loss of power, possibly his life . . . Communistic program probably modified in Yugoslavia and its achievements indefinitely postponed.



LONDON — Six months have passed since the Cominform denounced Tito. Yugoslav policy remains linked to that of the Soviet Union and Mr. Bebler's speeches before the United Nations are no less obstructive and insulting to the western Powers than those of Mr. Vyshinsky. Yet Moscow continues to condemn the Yugoslav regime, and in a speech recently Mr. Molotov again denounced the "treachery" of the "nationalistic Tito clique."

Yugoslavia's "popular democratic" neighbors have not confined themselves to words. The Rumanian government seems to have been implicated in the attempted escape of General Jovanovic and has exerted pressure on Yugoslav diplomats in Bucharest and on the Yugoslav minority in Rumania to disown Tito. Those who have refused have, according to Belgrade, suffered persecution. The Hungarian government is reacting in the same way to Yugoslav diplomats in Budapest, and a major of the Hungarian political police stated that Yugoslavs possess no diplomatic rights. In Bulgaria, agitation against Tito's rule in Macedonia is growing, and is becoming steadily less distinguishable from the Great Bulgarian propaganda of the prewar regime. In Albania the Communist Party has been purged, and Koci Xoxe, the former Minister of Interior and police chief, has lost his job and been disgraced for pro-Tito deviationism. These are signs that the Moscow dictated hostility of the neighbor satellites is a serious matter for Tito. Perhaps even more serious are the admitted difficulties in obtaining vital imports from the more distant and more industrialized satellities, Czechoslovakia and Poland. In a speech this week Tito complained that the eastern states were treating Yugoslavia's people's democracy worse than they have treated the capitalist states.

IT MAY be taken as certain that the Cominform's agents are doing their best to subvert the Tito regime from within. As long as Tito maintains an iron dictatorship based on the Soviet form of Marxist ideology, their task will be facilitated. They can count on the sympathy of the small number of veteran Yugoslav Marxists and of all unprincipled careerists who have joined the party for personal gain. The latter, who have always been numerous in all Balkan states under all regimes, will no doubt go over to the big red battalions as soon as it seems safe. Tito's friend, Rankovic, firmly controls the secret police, but it cannot be easy for him to decide whom he can trust. It is in fact only too likely that in Tito's own entourage there is treason: it would be surprising, in view of the past history of Communism in general and of Serbia in particular, if there were not.

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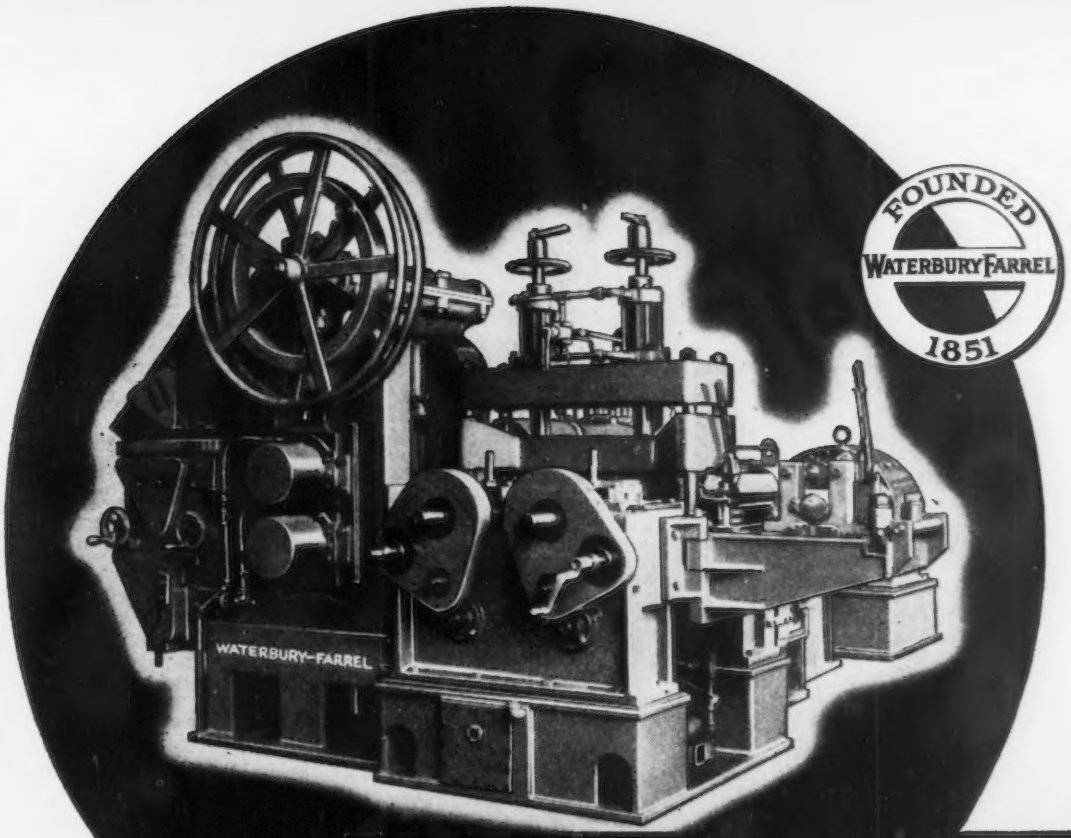
Meanwhile, material conditions are bound to deteriorate. The Five-Year Plan was too ambitious even for the most favorable circumstances. The results of linked prices, by which peasants were to be supplied with manufactured goods, have been disappointing. The boycott of the satellites is turning into a blockade, and yet the Yugoslav government still refuses the minimum concessions required for trade with the west. If present trends continue, there is real danger of internal disintegration, leading through mutiny and treachery to civil war and enabling the Soviets or the neighbor satellites to intervene to restore order.

Tito is too sharp a politician not to see these dangers, and though he has shown no sign that he wishes to be reconciled with the western Powers, it is improbable that he has not given the matter some thought. What in fact are the practical possibilities of a *rapprochement?* One possibility must be at least discussed before making an assessment of Tito's chances. If Moscow expected war, it might make temporary concessions. Tito on his side might for a brief period cooperate with the west solely in order to raise his own price. When the time came, Moscow, needing him for war, would accept him as an ally, and he would for the second time betray the west. Cooperation leading to this result would be a bad bargain for the western Powers—and for Tito. It would be a bad bargain for Tito because, once Soviet troops had entered Yugoslavia in the course of military operations, a way would be found to liquidate the Marshal. If, however, Moscow has no thought or expectation of war, Tito has only one thing to hope from the Kremlin —and that is the acceptance of his complete capitulation. The consequences of such action must obviously be known to him. He would disappear from the political scene, and perhaps from this world. The history of Communism shows that such capitulations are possible. If it is proved expedient that one man should perish for the good of the Party, the one man may willingly accept his sentence. But Tito does not seem quite the type of Party fanatic who has been capable of such self-abnegation in the past.

There thus seem to be two alternatives before the Marshal.

(CONTINUED ON PAGE 130)



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MARKET BRIEFS

• **ALLOY STEEL**—No change in the alloy steel sales picture is reported in the cards for the next few months. Demand still exceeds supply, particularly in bars. Three sections of the voluntary allocations programs concern alloy users: military orders, freight cars and mining machinery, the latter not due formally until March. One of the big producers has already opened second quarter books with customers due to get about the same as they will in the first quarter. Others will open second quarter books soon. Demand appears smoother with less tendency to try to build up big stocks, but like all products, customers haven't yet shown any desire to take less than they can get.

• **EXTRA CARD**—Effective Dec. 20, Armco Steel Corp. began using a new card of extras for gage width and pickling of heavy hot rolled sheets and hot rolled strip. Revisions were also made in gage and width extras on cold rolled sheets in 17 gage and heavier and on enameling iron 15 gage and heavier. Base prices of these products remain the same. J. A. Ingwersen, vice-president in charge of distribution, said the adjustments were made to correct inequities in price structure of the items involved.

• **RAIL INCREASE**—This week, Colorado Iron & Fuel Corp. announced that they had raised the base price of rails from $3.35 per 100 lb to $3.50 per 100 lb, effective Nov. 22. This means that new price prevails f.o.b. Minnequa, Col.

• **MYSTIC PIG IRON**—The Mystic Iron Works of Everett, Mass., has increased the price of pig iron, effective Jan. 1, 1949. The new price for No. 2 foundry iron is $52.75 per ton against the current price of $49.50 a ton. The $3.25 advance is based on higher payroll and raw material costs.

• **HOT ROLLED EXTRAS**—Youngstown Sheet & Tube Co. has advanced hot rolled sheet and strip extras. The average boost, according to customers, is about the same as those made by Jones & Laughlin and Republic. Details, like those on all hot rolled sheet and strip extra increases during the last few months, vary. Sheet & Tube for instance, has more divisions in width extras than most of the others.

• **PIPE DEMAND**—Pipe will probably carry off the honors for the "tightest product of the year" again in 1949. Producers are booked up into 1952 on line pipe for oil and gas companies report no dip in demand for standard pipe. Next year's production in pipe and tube mills will be higher. Republic has added about 100,000 tons of annual production capacity at Gadsden, in 20 to 30-in. diameters, boosting the nation's capacity by more than 25 pct in these larger sizes. National Tube will bring in a 300,000-ton mill in the spring. Youngstown's Sheet & Tube Fretz-Moon continuous butt-weld mill is a year and a half from completion.

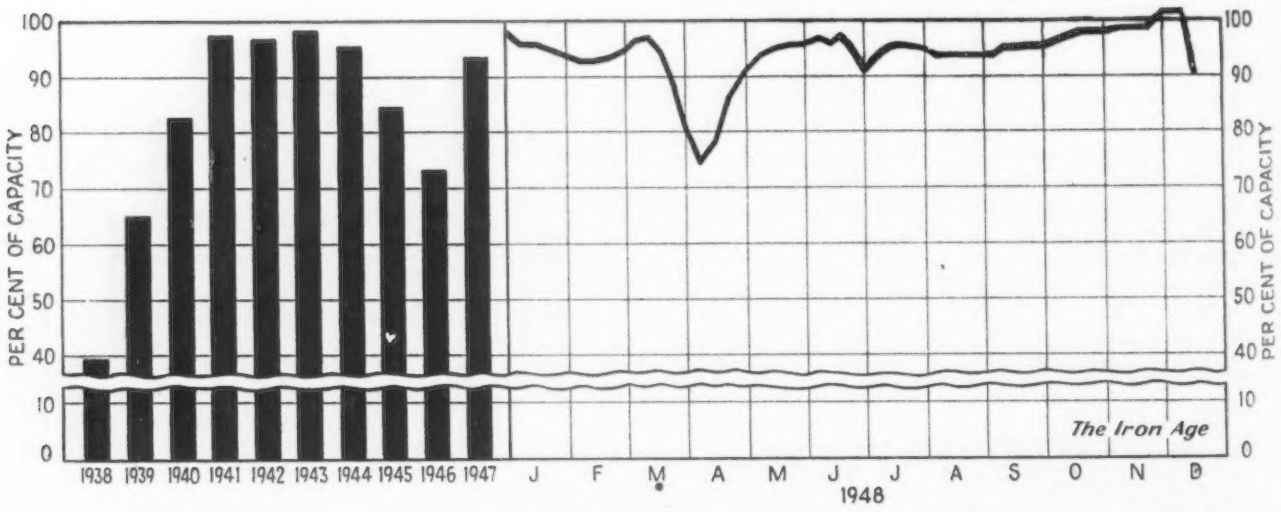
• **A QUICKIE CAUGHT**—Customs officials in Chicago are trying to collect $100,000 duty on foreign aluminum reaching here from England, Holland and Belgium. They charge that 2500 tons of pigs and ingots were billed as scrap when it was actually useable virgin material. The material was in cases sawed in half. Settlement may revolve around Section 562 of The Tariff Act which lists permissible manipulations.

• **WAREHOUSEMEN'S ANSWER**—Effective Dec. 20, Carnegie-Illinois Steel Corp. and American Steel & Wire Co. reduced quantity extras on their stainless steel products. Details had not been completely worked out at press time but it is understood the reductions will average approximately 5 pct.

• **WINDY WATERS**—Chicago is leaning more and more on water transportation. Last winter if it hadn't been for barge shipment of fuel oil through the Illinois waterway many Chicago homes would have been cold. Railroads are losing 25,000 carloads of revenue a year to this fast growing water movement.

• **APPLIANCES EASE**—Figures are now coming in to the extent of how far appliance sales have actually slipped. In November standard size vacuum cleaner sales totaled 9.5 pct less than October and were 27.2 pct less than November last year. Sales for first 11 months of '48 totaled 3,086,969; 1917 was 3,427,433 compared to 2,289,441 for entire year of 1946.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Dec. 14.....	99.0*	100.5*	94.0	98.0	100.0	105.0	100.5	103.0	105.0*	104.5	107.0	91.5	98.0	105.0
Dec. 21.....	83.5	86.0	82.0	93.0	93.5	105.0	89.0	100.0	102.0	104.0	107.0	89.5	90.0	90.0

* Revised.

Industrial News Summary

- **Steel Price Boosts Depend on Costs**
- **If Wages Go Up So Will Steel Prices**
- **Output of Steel to Stay at Top Level**

STEEL people know as well as anyone else that prices are too high; that more increases in steel may price this product out of some markets. Knowing all this steel firms will still have to increase prices again if wages go up in 1949. The only reason further boosts have not been made in base prices is because economies and better utilization of equipment have kept rising steelmaking costs in check.

For the near future there is not a chance of any across-the-board, or general, increase in the base price of steel products. Adjustments which are made will come in extra charges which are being revised as costs dictate a higher return. Most of the extra changes recently have come about because of increased prices mills have paid for raw materials needed to produce coated steel items.

One thing is certain—there will be no general reduction of steel prices next year. And for that reason those holding steel inventories have no fear of losses because of holding this material. Steelmaking costs are not as flexible as they were 10 years ago. They are not flexible at all. And what worries most steel heads is the $64 question, "How will the industry in years to come get the money to buy new plants or replace old?"

The worries of the steel industry are not shared by steel labor. Next year will be its last chance for some time to go after a large raise—not in cents per hour but in lasting benefits. Steel labor will come out strong before next July for a wage increase, a social security package including bigger and better pensions and insurance. The last two items mean as much in terms of bigger steelmaking costs than any other wage raise.

The United Steelworkers' union will be militant on the matter of a social security package. According to them it is long over due. Progress has been slow. But before the next contract period rolls around next June some steel firms will have an idea of what they will do. So will labor have an idea of what they will do.

WHETHER or not steel labor gets more than a moderate increase in wages, the real stumbling block could be the social security plans which will be demanded. On this item alone the union has the right to strike. It had been thought that it would not strike for such a concession. That is no longer a generally held opinion. With chances of the Taft-Hartley Bill being changed and the "1949 or never" it can be expected that social benefits will be fought for—just as hard as wages have been in the past.

There is now no reason to believe that steel will strike in 1949. But there is every reason to expect a work stoppage if a wage-social-benefit impasse turns up at midyear. The cost of living will effect the demand for wage increases but it will not change one iota the drive for permanent benefits such as insurance, hospitalization and pensions.

Steel will pour out of furnaces and plants between now and the middle of 1949. If there is to be a work stoppage in steel it will not hit till after midyear. Demand for steel will have a direct bearing on the position steel firms will take on labor demands. Right now steel officials believe prices are high enough. Yet it is a sure bet that if wages go up so will prices.

Steel firms have more to face than just wage costs alone. Raw material costs are still slowly rising. Freight rate increases look like a sure thing for next year and equipment prices are not slated for a decline. In the face of these items alone steel will find costs higher next year.

THE sad thing for steel people is the realization that present profits—some of which are being used for expansions and replacements—are dependent to a large extent on the present high rate of output. If there is to be any drop in output late in 1949 there will be a corresponding drop in profits—or a sharp rise in steelmaking costs. It looks like a tug of war between steel and labor in the latter part of the second quarter of 1949.

There is no sign this week of any weakening of overall steel requirements. Nor is any expected. Sheet users are in for a surprise next year when more and more new equipment will be putting out sheets at a rate far surpassing anything the industry had hoped for.

Steel output this week is estimated at 90 pct of capacity, down 10.5 points from last week. There is nothing now that indicates a steel rate any lower than near capacity for months to come.

On the scrap horizon it can be expected that buyers will do everything they can to batter down prices. Scrap has always been a sensitive item. But this week there is no sign that buyers will soon have their way with lower quotations.

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Clean parting of castings from permanent molds is an important demand of efficient foundry operation. The Arrow Aluminum Castings Company, Cleveland, Ohio, gets better mold reproduction, longer mold life, easier parting and smoother surfaces on its castings by coating permanent molds with "Sono-Graph", a mold wash produced with **"dag"** colloidal graphite by the Mealey Grease and Oil Company, Cleveland, Ohio.

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dag COLLOIDS

Jobbing Foundries Bearing Brunt of Year End Slump in Castings

Tonnage Shops Still Doing Well; Slump Called Move To Adjust Inventories

New York

• • • **Gray iron** foundrymen are concerned about a decline in casting order backlogs. While this decline is spotty, it has in many instances reduced foundry operations to a 3 or 4 day week. These are the salient points revealed by a nationwide check of foundry operations conducted by the editors of THE IRON AGE.

The first signs of the development began to appear some 3 months ago. But foundrymen mostly discounted the signs. They had been lulled into a false sense of security by longterm heavy backlogs.

Even now the order situation is spotty. Some foundries in every area of the country are still doing a heavy business. Foundries catering to the automotive industry are generally in a good position.

Jobbing foundries have borne the brunt of the order decline. A contributing factor has been the decline in the casting requirements of production foundries. This has caused them to withdraw some business from jobbing foundries in order to continue their own operations at the maximum rate.

Until recently some foundrymen, watching their backlogs evaporate, wondered whether others too were losing orders. It is true that there has been a good deal of shopping around lately by customers in search of higher quality castings. Patterns have been moving from shop to shop. Customer grumbling about machining losses due to poor castings is reported to be mounting—and rejections increasing.

One of the commonest explanations of the order decline is that customers have been leveling off inventories for the year end. Heavy inventories were formerly thought necessary as protection against long delivery periods. Foundrymen say that inventory-conscious buying is a feature of normal foundry business that has no significance on first quarter volume.

One New Jersey foundry was appalled when it discovered that its backlog of 6 months or more had dropped within 6 weeks to less than a month. It promptly reduced its 5-day week to 4.

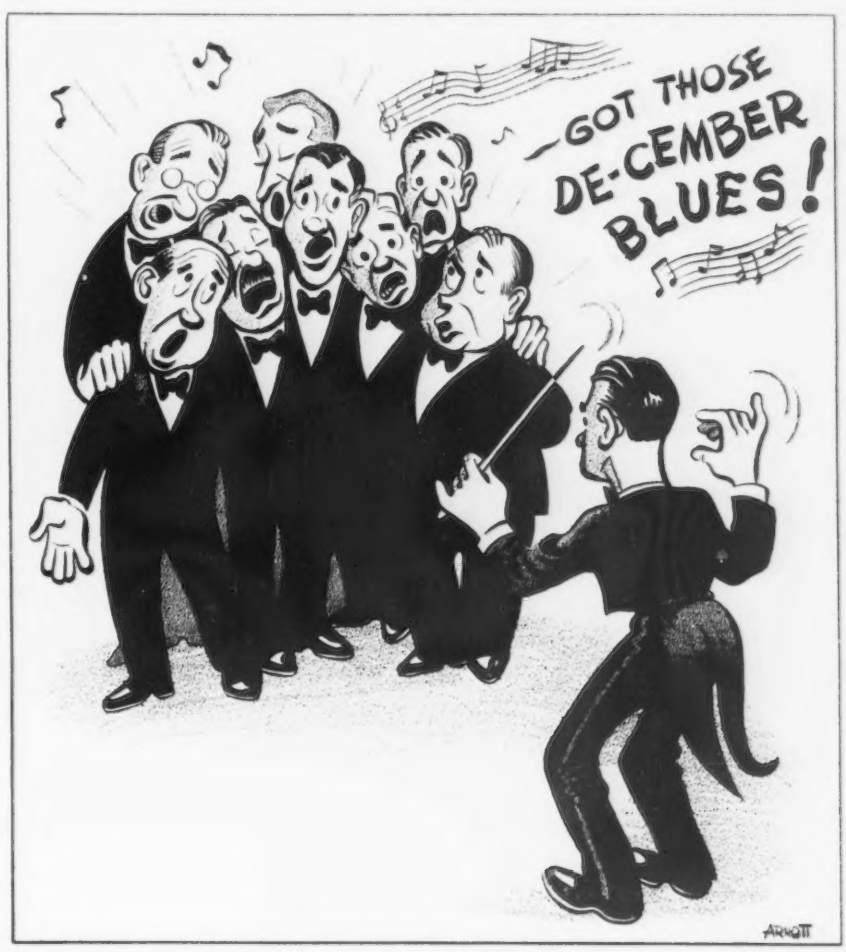
A New England foundryman attributes the decline to the "year end easing off." He says the industry has been expecting defense orders but these have not materialized. Orders from textile machinery manufacturers have been slow for some time.

Philadelphia foundries report a general slowing down. Big casting consumers have stopped putting orders outside their own shops. One consumer which had been farming out castings to about 40 small foundries has now concentrated its business in four foundries. One big foundry in this area formerly farmed out casting business to the extent of 25 tons a day. Now these patterns are being brought back into its own shop. Another Philadelphia foundryman put it this way: "December blues are back again in the foundry industry."

In the Reading district one big foundry has cut its operations to a 4-day week. But it reports as big an order book for January and February output as it ever had.

The big pressure pipe foundries who take jobbing business have

Foundrymen's Chorus ! !



suffered a drop estimated at 25 pct of their jobbing work. However, their pressure pipe backlogs are still very high. They say operations will continue at peak levels despite the seasonal layoff in pipe installations.

Most eastern foundries are in a better position for raw materials now than they have been for months, now that the Mystic furnace is operating and Swedeland is producing foundry iron again. Yet there is still a long term shortage of foundry iron. The foreign iron market in the East is all but dead, although some foundries still have stocks of foreign iron on hand. They use this sparingly. Foundries fear that steel producers, watching foundry business for the first signs of a decline, might switch their output from foundry iron to basic iron.

In Pittsburgh one foundryman described the declining business as "a purchasing agent's strike." "A technical correction for inventory purposes," said another. These men don't believe the dip in foundry orders reflects a real decline in their customers' business. They think purchasing men have adopted a "wait and see" attitude, hoping to get lower prices when they come into the market next year.

There is also a new and definite emphasis on quality. Now that some casting inventories have been built up buyers are getting tired of hearing poor quality castings blamed on bad coke, iron or scrap. They shop around for foundries that can produce to specifications. And they test to see that these specifications are held.

A number of smaller jobbing foundries have cut the work week from 6 to 5 days, a few work only 3 days a week. Yet other jobbing shops report business holding up well.

On the brighter side the big steel foundries working on basic steelmaking equipment, both in steel and iron castings, are going like a house afire. One of the biggest production foundries in Pittsburgh is planning to boost output by 40 pct next year. Foundries which produce the major tonnage of castings in this district report business is good.

There is a tendency, according to competent observers, to cry wolf because of the *number* of foundries that are hitting rough sledding, rather than considering the limited tonnage these foundries produce. Coming out of a lush sellers market into a buyers market, some companies are unprepared for competitive conditions. Until there are definite signs of a substantial tonnage drop, these observers choose not to get alarmed. They'll wait and see, with the prospect that order volume in the first quarter of 1949 will tell a more accurate story.

In the Midwest business is spotty too. Backlogs in two typical cast iron shops are down 60 pct from 6 months ago. Both of these shops are still running 5 days a week. But on many items they can promise delivery from stock. Malleable iron foundries, with the exception of the railroad shops, have not slowed down, but their backlogs are quite short, 2 weeks to a month. Foundries in the plumbing field are hoping that the spring building program will open up enough for them to increase their operating rate.

One of the largest steel foundries in this area, this one having five separate divisions, is still experiencing good operations, although backlogs — even in the strongest lines—are down to 2 to 3 months. In order to keep their operations going, they have had to change their products. They are making openhearth ingots for the steel conversion program.

On the West Coast the story is much the same. A check of the San Francisco Bay Area indicates that operations are down to about 60 pct capacity in many instances. The exceptions are the larger foundries, or those closely tied up with producers of industrial equipment—where job work is of lesser importance. Thus, on a tonnage basis, business is not as bad as it might appear at first look.

Job foundry backlogs are virtually non-existent beyond Jan. 1. One well informed foundry operator said, "business looks very dark for the immediate future after the 1st of January and the local situation has been made more acute because of the recently ended 3-month maritime strike which has had a dampening effect on ship repair and maintenance."

Cast scrap prices were weaker last week in most markets. Some of the slipping in quotations—which averaged around $1 a ton—was due to less demand from jobbing foundries. But better pig iron output and better supplies at larger foundries were also contributing factors.

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RECONSTRUCTION: *One of the three new storage tanks being built at the war damaged Shell Oil Refinery in Hamburg is shown in the photo. This is one of Northern Europe's largest refineries. Pre-war capacity of the plant was* 350,000 *tons per year. This tank and the other two under construction will have an annual capacity of about* 2.5 *million gal.*

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Purchased Scrap Consumption at New High; Dealers Are Largest Single Source

Washington

• • • **Purchased scrap** consumption by United States steel mills, foundries and chemical plants totaled more than 29 million tons this year, according to the Institute of Scrap Iron & Steel. This was 11 pct over last year's purchases and 20 pct more than what was consumed during the peak year of the war.

Best of all, consumers were able to increase their inventories by almost 1 million gross tons to a level 50 pct above that at the time of Pearl Harbor and slightly larger than the immediate prewar high.

During the year stocks of dealer scrap remained steady, although abnormally low compared with prewar standards despite record-breaking consumption and substantial consumption consumer inventories.

While consumption of purchased or open market scrap, largely provided by dealers, increased 11 pct this year, the melt of home scrap and pig iron barely topped 1947.

As a result the percentage of purchased scrap in the average steel furnace charge increased in 1948 to 27.4 pct compared with 24.5 pct in 1947. The average charge of home scrap was 25.9 pct compared with 26.2 pct in 1947, while the average percentage of pig iron used dropped from 49.3 pct in 1947 to 46.7 this year.

Of the 30 million tons of purchased scrap handled in 1948, 29 million tons was consumed and 1 million tons applied to mill inventories. About 9.5 million tons originated in metalworking factories as a byproduct of machining, fabricating and otherwise converting rolled steel products and iron castings into capital and consumers' goods, while the railroads marketed approximately 4 million tons, about the same as they provided last year.

Scrap dealers not only processed and shipped a substantial portion of this 13.5 million tons of industrial and railroad scrap, but also generated about 16.5 million from farms, auto wreckers, demolition, shipbreaking, government surplus and the general-run of collections that start with the one-horse alley-peddler.

It is difficult to break down the exact amount received from the categories, but approximate tonnages are estimated in the accompanying table.

It is estimated that in 1949 production of steel ingots will amount to about 92 million tons, while the output of castings will probably drop to 12.5 million tons.

Additional blast furnace capacity to make pig iron probably will not quite offset the increase in steelmaking capacity, nor will it enable iron foundries to return to their prewar balance of scrap and pig iron in their charges. Hence the requirement for purchased scrap in 1949 should increase slightly.

The supply of factory or industrial scrap will probably remain constant at about 15 pct of the total quantity of steel fabricated and 5 pct of iron castings machined, but show some increase as more steel becomes available.

A survey of leading railroads indicates they may offer about 250,000 more tons of scrap, an increase of 5 pct, in 1949, provided they get expected new rolling stock and track material.

Imports of scrap from China and Japan are slated to decline, but those from Germany will increase, possibly bringing total imports in 1949 up to 1 million tons.

Shipbreaking and government surplus will again be dwindling sources of scrap in 1949, while auto wreckers will probably produce more.

Assuming that the price of scrap continues an incentive to collectors, that the Department of Commerce drive develops an extra 1 million tons, and there is no war, scrap requirements of steel mills and foundries should be reasonably satisfied in 1949.

Origin of Purchased Scrap

(In thousands of net tons)

Source	Tons	Pct
Metalworking	9,500	31.6
Railroads	4,000	13.2
Dealers	16,500	55.2
Shipbreaking	500	
Autowrecking	1,500	
Govt. surplus	500	
Farms	1,250	
Imports	350	
Gen. dealer	12,500	
Total	30,000	100.0

SALVAGE: *Bob Chambers drove his cab to this Carnegie Illinois slag dump to pick up a fare one day. When he saw pieces of steep scrap in the slag he forgot about the fare and pondered on how he could get the scrap out. Finally he arrived at the idea of using a magnet crane.*

Industrial Briefs . . .

• PLATING METHOD—An improved acid copper bath which makes possible plating speeds up to 0.001 in. in 10 to 15 min has been deevloped by Dayton Bright Copper Co., Dayton. This new method employs no cyanide or hot baths and, because it gives off no offensive fumes or odors, requires no ventilation.

• RAIL ORDER—The New York Central System has announced that orders totaling about $6.5 million for approximately 100,000 net tons of steel rail were placed with Carnegie-Illinois Steel Co., Bethlehem Steel Corp. and Algoma Steel Co. in Canada.

• ACQUISITION—Fort Duquesne Steel Co., Pittsburgh, has purchased majority stock control of the Hamilton Steel Co., Cleveland. Harry K. Hamilton will continue as president of the Hamilton company and Donald C. Lott, president of Fort Duquesne, has been elected chairman of the board of directors. E. W. Harwell, until recently assistant manager of warehouses of Jones & Laughlin Steel Corp., has been elected vice-president and general manager.

• CHANGE OF ADDRESS—Rockwell Mfg. Co. has announced that its Pittsburgh Equitable Meter and Nordstrom Valve Divisions will be located at 25 Beale St., San Francisco, and 1102 Delano St., Houston.

• NEW YORK AGENT—L. G. Rose of 30 Church St., New York, has been appointed agent by Boneham & Turner Ltd., Mansfield, England, for their jig grinder heads.

• ELECTS OFFICERS—The Capitol District of the Institute of Scrap Iron & Steel has elected Philip Sher of the Hudson Scrap Iron & Metal Co., Albany, as president. Leonard Klein, Joseph Klein Co., Albany, was named vice-president and Herman Garbowitz, Samuel Garbowitz Co., Schenectady, was elected treasurer.

• ENTERS NEW FIELD—Texas Engineering & Mfg. Co., Dallas, has entered the electronics field with substantial contracts to produce automatic code flashers designed by W. R. Lightbody, Inc. of New York.

• NAME CHANGE — Rigidized Metals Corp. is the new name which has been adopted by the former Rigid-Tex Corp., Buffalo, producers of design-strengthened and textured stainless steel, aluminum and other ferrous and nonferrous metals.

• TO RECEIVE MEDAL—Malcolm Pirnie of Malcolm Pirnie Engineers, New York, has been named 1948 winner of the Hoover Medal, jointly awarded by four national engineering societies. The award is in special recognition of Mr. Pirnie's leadership in the formulation of a program sponsored by the Engineers Joint Council, for the postwar industrial control of Germany and Japan.

• EXPANDING—Wilson & Geo. Meyer & Co., Pacific Coast distributors of agricultural and industrial chemicals, is constructing a $150,000 warehouse and office building in Los Angeles. Among the products which will be warehoused are copper, magnesium, manganese and zinc compounds.

• SOUTHERN OUTLET—Wheelco Instruments Co., Chicago, has announced the opening of a new district office at 2204 Fannin St., Houston, under the direction of George Hatfield.

• CHANGES NAME — Effective Jan. 1, the Southern Steel Works Co., Birmingham, will change its name to O'Neal Steel Works Co. The warehouse affiliate, Southern Steel Co., will become O'Neal Steel Co.

Deere & Co. Negotiating For Crucible Furnaces

New York

• • • **Crucible Steel Co.** of America people confirmed last week that negotiations are underway for sale of melting facilities at the company's Park Works, Pittsburgh, to Deere & Co., of Moline, Ill. The negotiations do not concern any of Crucible's finishing facilities and will have no effect on other divisions of the company.

The facilities involved include 4 openhearth furnaces of 50-ton capacity and 2 arc-electric furnaces of 10-ton capacity. Total annual capacity of these facilities is rated at about 175,000 tons. They were built during World War I.

The company emphasized that the Park works is essentially a finishing plant and that none of these facilities are involved. As presently envisioned Crucible would continue to operate the melt shop for Deere & Co. Crucible would receive a share of the ingots. But the major portion of the output would go to the Deere Co.

Deere & Co. manufactures farm equipment and machinery. Trade circles interpret the negotiations to buy steelmaking facilities as a move on the company's part to assure itself a supply of steel. Ingots from the Park works would need to be converted into finished steel.

The contract between the two companies is expected to be signed this week.

Deere & Co. has been in the conversion market for some time. Inland Steel in Chicago has been doing much of their conversion, practically all of which has been bars or sections. Up until now a large share of their ingots have been coming in from the West Coast, It appears their Crucible purchase would enable them to get their ingots somewhat cheaper in spite of the freight from Pittsburgh.

Southern States Dividend

• • • **Southern States** Iron Roofing Co. has announced a fourth-quarter dividend of 31¼¢ per share on preferred stock and 25¢ per share on common stock payable January 2nd to stockholders on record December 20, 1948.

French Will Purchase $50 Million Steel Mill If U. S. Gives Approval

Pittsburgh

• • • **A combine of eight** French companies wants to purchase a $50 million complete 66-in. cold strip steel mill in this country. This is in addition to the $27 million 66-in. continuous hot strip mill now being shipped by United Engineering Co. for the two-company combine at Denain. (THE IRON AGE, Nov 14, 1946, p. 116.)

This was disclosed here by Albert B. McCloskey, Westinghouse Electric International Co., and G. E. Stoltz, Westinghouse Electric Corp., who recently returned from a 5-week tour of France, Belgium and Switzerland. They said that the equipment outlined by the new French combine, Sollac, included a 46-in. blooming mill, a 66-in. hot strip mill, a 66-in. three-stand cold sheet mill and a 48-in. five-stand cold strip tinplate mill with electrolytic tinning lines and auxiliary equipment. Units would be built at Hayange and Ebange in northeastern France.

Approximately 30 pct of the money needed for this equipment has been raised by stock and bond issues in France. If all goes well the balance will be supplied by the French Government out of ECA funds.

There has been no indication to date as to who will get the order for the mill if the deal is approved. Westinghouse, it was indicated, would get the electrical equipment order. The tinplate mill will probably be a duplicate of that of Jones & Laughlin at Aliquippa if Mesta gets the order. If United gets it the Weirton type tinmill will probably be furnished.

•

Ore Shipments Increase

Stockholm

• • • **Sweden's iron ore** shipments during the first 10 months of 1948 amounted to 9,851,000 tons, an increase of 40 pct compared with the same period last year, when the quantity exported was 6,902,000 tons.

More than half of the shipments went to Great Britain, Belgium and Luxembourg. The balance was divided among the United States, bizonal Germany, Czechoslovakia, Poland, the Netherlands, Finland, Norway, and Austria.

Swedish exports of iron and steel totaled 103,000 tons, a slight increase over last year. Imports of pig iron went down from 115,000 to 84,000 tons, while imports of structural steel were practically unchanged at about 560,000 tons.

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Plans New Steel Mill

Belgrade

• • • **Yugoslavian iron** and steel industry is going to be run by British experts, according to the Mackenzie Engineering Co., which is here to study and advise on the country's 5-year plan.

The Minister of Heavy Engineering says the agreement is a part of a series of trade pacts which are under negotiation between the two countries.

British businessmen in Yugoslavia recently reported that they have already signed contracts for rolling mill machinery.

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French Imports Increase

Paris

• • • **Excess of French** imports over exports increased further during October. Imports valued at 72.2 billion francs were up 10 pct, while exports set at 44 billion showed an increase of 4 pct.

The upward pressure on domestic prices resulting from the recent devaluation of the franc was increased last month by a reduction of subsidy payments in the program to stabilize the cost of many basic commodities.

An increase of 18.5 pct in the price of coal was followed shortly by respective advances of 25 and 19 pct in gas and electricity.

Volta Redonda Grows

Volta Redonda, Brazil

• • • **Steel production** at the Volta Redonda plant is expected to exceed 200,000 tons this year as compared with 146,000 tons for 1947. As a result of this increase in output, the State of Rio de Janeiro now accounts for 60 pct of Brazil's entire output of steel, while the respective figures for the States of Minas Geraes and Sao Paulo have fallen off to 20 and 15 pct, respectively.

Although Brazil is badly in need of railroads which she could use to good advantage for developing an extensive ore export trade, rails are a major factor in her current export trade. She is hard pressed for money. So during the first half of this year rails valued at $3.3 million were exported.

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Russian Output Rises

Stalingrad

• • • **Russian steel** production is going to hit a new peacetime peak this year with 22,220,000 net tons of ingots. This is more than 5 million tons over last year's output.

Officials point to (1) adequate stockpiles of raw materials at the mills during bad weather and a comparatively mild winter, (2) more efficient productivity of labor, and (3) operation of new, modernized and rebuilt facilities.

The Soviet goal for 1950 is set for about 27.5 million net tons. Many plants, particularly the Magnitogorsk plant, have already reached their 1950 goal, while the Red October plant here attained prewar production during August.

Coming Events

1949

Jan. 10-14 **Society of Automotive Engineers**, annual meeting, Detroit.
Jan. 10-14 **Material Handling Institute and American Society of Mechanical Engineers**, Materials Handling Show, Philadelphia.
Jan. 14 **Malleable Founders' Society**, semiannual meeting, Cleveland.
Jan. 24-25 **Industrial Furnace Manufacturers Assn.**, mid-winter meeting, Cleveland.
Jan. 24-28 **American Society of Heating & Ventilating Engineers**, annual meeting, Chicago.
Feb. 9-10 **Steel Founders Society of America**, annual meeting, Chicago.
Feb. 14-17 **American Institute of Mining & Metallurgical Engineers**, annual meeting, San Francisco.
Feb. 28-Mar. 4 **American Society for Testing Materials**, spring meeting, Chicago.
Mar. 8-10 **Society of Automotive Engineers**, passenger car, body and production meeting, Detroit.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1948
(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter	*19,855,413*	*95.5*	*1,047,000*	*80.6*	*1,118,702*	*83.4*	*22,021,115*	*94.0*	*1,693,932*	*13.00*
April	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd Quarter	*18,921,336*	*90.9*	*897,461*	*69.0*	*1,227,366*	*91.4*	*21,046,163*	*89.7*	*1,617,691*	*13.01*
1st 6 months	*38,776,749*	*93.2*	*1,944,461*	*74.8*	*2,346,068*	*87.4*	*43,067,278*	*91.9*	*1,655,797*	*26.01*
July	6,346,423	89.8	324,991	73.6	395,610	86.7	7,067,024	88.7	1,598,874	4.42
August	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
September	6,592,226	96.3	387,153	90.5	436,231	98.7	7,415,610	96.1	1,732,619	4.28
3rd Quarter	*19,569,806*	*93.2*	*1,083,349*	*82.5*	*1,267,087*	*93.5*	*21,920,242*	*92.6*	*1,669,478*	*13.13*
9 months	*58,346,555*	*93.2*	*3,027,810*	*77.4*	*3,613,155*	*89.4*	*64,987,520*	*92.1*	*1,660,386*	*39.14*
* October	7,118,299	100.5	409,545	92.5	459,268	100.4	7,987,112	100.0	1,802,960	4.43
† November	6,910,184	100.7	411,049	95.9	441,983	99.8	7,763,216	100.4	1,809,607	4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										*52.28*

Note—The percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons Bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of January 1, 1948 as follows: Open hearth 83,610,690 net tons, Bessemer 5,226,000 net tons, Electric 5,396,770 net tons, total 94,233,460 net tons.

* Revised.
† Preliminary figures, subject to revision.

YEAR 1947

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,550,058	95.2	384,096	87.7	288,458	66.9	7,222,612	93.2	1,630,386	4.43
February	5,835,018	93.9	314,912	79.6	280,471	72.0	6,430,401	91.9	1,607,600	4.00
March	6,619,641	96.2	378,893	86.5	318,440	73.8	7,316,974	94.4	1,651,687	4.43
1st Quarter	*19,004,717*	*95.1*	*1,077,901*	*84.8*	*887,369*	*70.9*	*20,969,987*	*93.2*	*1,630,637*	*12.86*
April	6,365,670	95.5	375,675	88.6	310,497	74.3	7,051,842	93.9	1,643,786	4.29
May	6,640,004	96.5	372,878	85.2	326,132	75.6	7,339,014	94.7	1,656,662	4.43
June	6,317,705	94.8	351,247	82.8	308,762	73.9	6,977,714	92.9	1,626,507	4.29
2nd Quarter	*19,323,379*	*95.6*	*1,099,800*	*85.5*	*945,391*	*74.6*	*21,368,570*	*93.9*	*1,642,473*	*13.01*
1st 6 Months	*38,328,096*	*95.4*	*2,177,701*	*85.2*	*1,832,760*	*72.8*	*42,338,557*	*93.5*	*1,636,589*	*25.87*
July	6,033,512	87.9	256,125	58.6	289,048	67.2	6,578,685	85.1	1,488,390	4.42
August	6,329,497	92.0	346,033	79.0	315,622	73.2	6,991,152	90.2	1,578,138	4.43
September	6,152,348	92.5	334,425	79.0	310,684	74.6	6,797,457	90.8	1,588,191	4.28
3rd Quarter	*18,515,357*	*90.8*	*936,583*	*72.2*	*915,354*	*71.6*	*20,367,294*	*88.6*	*1,551,203*	*13.13*
9 Months	*56,843,453*	*93.8*	*3,114,284*	*80.8*	*2,748,114*	*72.4*	*62,705,851*	*91.9*	*1,607,842*	*39.00*
October	6,831,984	99.3	384,272	87.8	353,896	82.1	7,570,152	97.7	1,708,838	4.43
November	6,543,390	98.2	360,620	85.0	338,417	81.0	7,242,427	96.5	1,688,211	4.29
December	6,654,966	96.9	373,367	85.5	347,308	80.7	7,375,641	95.4	1,668,697	4.42
4th Quarter	*20,030,340*	*98.1*	*1,118,259*	*86.1*	*1,039,621*	*81.3*	*22,188,220*	*96.5*	*1,688,601*	*13.14*
2nd 6 months	*38,545,697*	*94.4*	*2,054,842*	*79.1*	*1,954,975*	*76.4*	*42,555,514*	*92.6*	*1,619,928*	*26.27*
Total	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

Symposium Helps Correlate Titanium Research and Development

About 200 Attend Meeting Sponsored by Office Of Naval Research

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By E. S. KOPECKI
Metallurgical Editor

o o o

Washington

• • • **Representing** the first concerted endeavor in correlating the efforts of the many researchers engaged in the research on and development of titanium and titanium-base alloys, a symposium was held at the National Academy of Sciences, Dec. 16. Sponsored by the Office of Naval Research, the symposium attracted some 200 technical people, representatives of government agencies, educational institutions and industrial laboratories.

Titanium—or the "Cinderella of metals" as it has been referred to in the popular press—does possess attractive properties even in its unalloyed condition, particularly with regard to its lightness, strength, corrosion resistance and ductility. Its high strength-weight ratio makes it attractive for aircraft construction as a substitute for aluminum, magnesium and steel. The possibility of titanium alloys serving the high temperature field is also under study, and the interest in this phase was certainly indicated by the presence of some well-known "high temperature metallurgists" at the symposium.

Various phases of the subject were explored, embracing reports on research and development programs now underway, production and properties of titanium, alloys of titanium, and physical metallurgy of titanium and its alloys. The symposium was particularly appropriate at this time, in that it did result in the dissemination of much valuable technical data, but more importantly, it focused attention on the fact that the overall program is sufficiently advanced to warrant clarification of processing methods and testing procedures. Physical properties do vary, sometimes quite considerably, depending upon the procedure employed in the making of the metal, since the various methods reported do produce metallic titanium containing different types and amounts of impurities.

All this was brought out at the meeting, interestingly enough, not by the speakers in their formal presentations, but rather in the spirited discussions that followed.

As the symposium progressed, it became apparent that physical property data—concerning endurance limit principally was being reported by various investigators to extend over a considerable range of values. It appears that when additional physical property data are revealed it will be necessary to associate the values with a particular method of metal production.

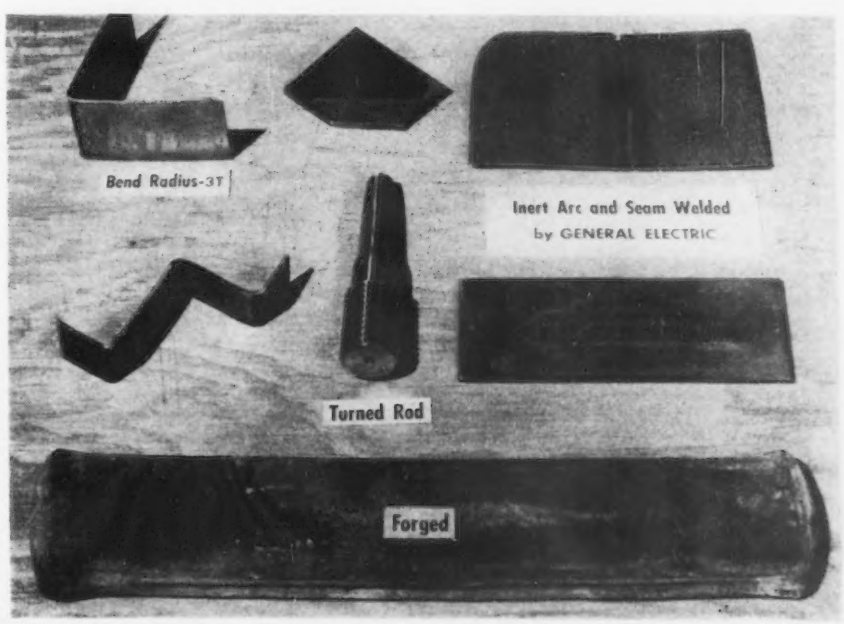
Although the metal production aspect came in for its share of attention, the overall interest did lie, necessarily, in the melting and alloying phases. Melting techniques are especially important, inasmuch as titanium is highly reactive and combines very readily with many gaseous and metallic elements. Methods of overcoming these difficulties were discussed by J. B. Sutton, E. I. duPont de Nemours & Co., in his paper entitled "Induction Melting of Titanium Metal in Graphite"; L. W. Eastwood of Battelle Memorial Institute discussed the "Production and Arc-Melting of Titanium"; while E. J. Chapin of the Naval Research Laboratory presented a "Description of Apparatus for the Melting of Titanium and for the Study of the Titanium-Oxygen System."

Physical properties of the commercially pure and refined types of titanium were revealed by C. I. Bradford, Remington Arms Co., B. W. Gonser, Battelle Memorial Institute, and F. B. Litton, Foote Mineral Co. Properties of the metal and its alloys are extremely interesting, and some of the significant results divulged at the symposium will be presented in a subsequent issue of THE IRON AGE.

The alloying phase, which will certainly constitute a long-range program, was introduced by E. I. Larsen, P. R. Mallory & Co., Inc.; H. C. Cross, Battelle Memorial Institute; and P. H. Brace of Westinghouse Research Laboratories.

For those interested in the detailed proceedings of this session,

UTILITY: *These exhibits of the Remington Arms Co., Inc., show titanium from the research program. The metal can be formed, spot, inert arc and seam welded, turned and forged.*



the Office of Naval Research, Navy Dept., Washington 25, announces that a limited supply of pamphlets, including copies of the 17 papers presented, will be available on request.

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AIME Talks Titanium, Too

New York

• • • **Any extensive** use of titanium metal, superimposed on top of present uses for titanium dioxide, will require a reappraisal of present titanium ore sources, F. R. Milliken, manager, National Lead Co., Titanium Div., MacIntyre Development, Tahawus, N. Y., told members of the New York Section, AIME, at a meeting held Dec. 16.

Mr. Milliken, in reviewing the development of the titanium industry, cited as two of the more important new sources of ore the New Jersey Zinc-Kennecott Copper Allard lake deposit and Du Pont's new development in Florida. The Russians, he said, had also reported new titanium ore deposits, but these have not been confirmed.

Roy Dahlstrom, technical director, National Lead Co., Titanium Div., another speaker at the meeting, decried the term "Cinderella of Metals," being applied to titanium metal. He stressed that the successful industrial use of titanium metal will require extensive application of engineering skill.

A report from O. C. Ralston, chief, metallurgical branch, Bureau of Mines, read at the meeting, pointed out that titanium metal and stainless can be competitive in many fields, and supplementary in many others.

Birmingham Plant Closes

Birmingham

• • • **Rheem Manufacturing** Co. is closing its Birmingham plant and production here will be absorbed by other plants of the company.

A company statement said that increased freight rates on products produced at the Birmingham plant and shipped to different areas of the United States and steel shortages were important factors influencing the decision. Warehouse facilities will be maintained here.

The Birmingham plant has been in operation since 1942 and employed approximately 2000 workers at the peak of employment.

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JET TRAIN MODEL: *Lorraine Santopadre holds a model of a jet propelled locomotive capable of speeds up to 250 mph which was originated by George Lanwerneger, 19, of Waukegan, Ill. It was shown recently at the American Inventors Exhibit, a permanent show place for inventions in Chicago.*

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Export Tinplate Raised

New York

• • • **U. S. Steel Export Co.,** U. S. Steel Subsidiary, announced the following new export base prices covering tin mill products with freight included to New York, Philadelphia or Baltimore.

These prices apply on carload lots and will become effective with shipments made on and after 12.01 a. m. Jan. 1, 1949.

All sales are subjected to seller's price in effect at time of shipment. All prices are net cash.

TIN PLATE 107#	PER BASE BOX
American Coke, 1.25 lb.....	$8.85
American Coke, 1.50 lb.	9.10
Ferrostan—unassorted, 0.25 lb	7.80
Ferrostan—unassorted, 0.50 lb.	8.05
Ferrostan—unassorted, 0.75 lb.	8.35
Special coated manufacturing ternes—unassorted	8.00
Manufacturing ternes — unassorted	8.55

Promises No Price Change

Hamilton, Ohio

• • • **Hamilton Foundry** & Machine Co. has announced in a letter to customers that casting prices established Oct. 1, 1948, and now in effect, will be generally continued for shipments through March 31, 1949. Until that date, the company's letter stated, prices on jobs on which there are no current quotations will be completed on the October, 1948, basis.

Alan Wood Dividend

Philadelphia

• • • **The board** of directors of Alan Wood Steel Co. has declared a regular quarterly dividend of $1.25 per share on the outstanding 5 pct cumulative preferred stock and a quarterly dividend of 25 cents per share on the outstanding common stock. Both dividends are payable Jan. 1, 1949 to stockholders of record Dec. 10, 1948.

M. A. Hanna Co. Dividend

Cleveland

• • • **Directors of** M. A. Hanna Co. have declared a dividend of $3.00 a share on common stock, payable Dec. 13 to stockholders of record at the close of business Dec. 3. The dividend makes a total of $5.00 a share in 1948, comparing with a total of $3.20 a share paid last year.

Paul Hoffman Orders Investigation Of Aluminum Flow from Britain to U. S.

Washington

• • • **The Economic** Cooperation Administration moved this week to prove that Marshall Plan countries can't have their cake and eat it too.

A full investigation into charges of resale by some Western European nations of aluminum and other scarce metals to the United States has been ordered by ECA Administrator Paul Hoffman and Deputy Administrator Howard Bruce.

After considerable prodding by U. S. metal customers (THE IRON AGE, Nov. 25, p. 137), ECA has concluded that Britain and other recipients of economic aid must decide between eating the cake and keeping it. Aluminum customers in particular complain that they are paying Britain three times for imported metal—in tax money for ECA appropriations, in shipping charges, and in over-the-market prices.

The investigation being conducted this week is focused primarily on British import figures and U. S. import records. In Britain, where exports are licensed as in the U. S., officials say no aluminum scrap has been licensed for export since 1946. In the U. S. the Commerce Dept. says that 34,600,000 lb plus were imported from Britain in the first 10 months of this year.

Mr. Bruce's attitude is this: If our investigation discloses that we are okaying purchase by the Western European countries of more materials than they need, we'll reduce their authorizations. If not, it stands as it is.

Thomas Finletter, ECA chief for Britain, offers two possible explanations for the difference between British export and American import figures.

For one thing, he states, exports from other nations which passed through the United Kingdom on their way to the U. S. may have been incorrectly marked as originating in the UK.

Another explanation, he adds, is that traders in fabricated aluminum imported such aluminum, if in poor condition, into the U. S. as scrap because of the prevailing high price here. But he states that no shipments of aluminum scrap could leave Britain without the knowledge of the British government "in view of the export control system now in force in Britain."

Early last week, Bruce stated that he would cut future ECA allocations of metals if export practices were not explained or brought under complete control by recipient countries. He named Britain, Belgium and The Netherlands as the offenders.

Later in the week he altered this stand and said he "had no proof" that the same metals paid for by ECA were resold here as scrap. But ECA is going to "look for the facts" he said and added that "if this return flow is caused by our sending too much scarce material we'll do something about it."

Seeks Gear Capacity Data

Pittsburgh

• • • **Two questionnaires** have been distributed by the American Gear Manufacturers Assn. for the purpose of getting data on the gearing industry which will help the National Security Resources Board in its study of American industry.

When this data is tabulated it will show the noncaptive gear cutting capacity of this country for the first time. Since gears are an important component in both our domestic and defense programs, this information will be extremely helpful to NSRB.

Although over 700 forms have been sent out, the association feels that it does not have a complete listing of all gear manufacturers in the United States. Any gear manufacturer who has not received such a form is requested to write for one to Newbold C. Goin, Executive Secretary, AGMA, Empire Building, Pittsburgh 22, Pa.

NEW LOOK: *The new aluminum foil laminate fire fighting suit, shown left, is rapidly replacing the bunkin suit, center, which has been used for many years by the Air Forces. The new style was created at the Air Materiel Command's Aero Medical Laboratory at Wright-Patterson Air Force Base, Dayton, Ohio.*

Engineers Predict New Continuous Coal Miner Will Revamp Industry

Pittsburgh

• • • **It won't** come overnight but a revolution in coal mining is on its way. This is the opinion of coal operators and independent engineers who saw the first public showing of a continuous miner near here last week. Joy Mfg. Co., developers and builders of the new machine, staged the demonstration at Mathies Mine, near Finleyville, Pa. Mathies is a Pittsburgh seam mine of Pittsburgh Coal Co., subsidiary of Pittsburgh Consolidation Coal Co., world's largest commercial coal company.

The business-end of the new Joy machine consists of a head, or ripper bar fitted with six chains each containing 20 tungsten carbide bits. This head, which can swing 45 deg from center in either direction, is advanced by hydraulic rams into the seam at the floor and then moved up to the roof.

The coal ripped from the seam by the head is carried over the back of the machine on a conveyor that loads it into an electrically operated shuttle car. The shuttle car moves back on rubber tires to transfer the coal. When mines are revamped to use the continuous miner the shuttle car will unload onto a conveyor that will feed coal cars outside the mine entry.

Greater safety and more efficiency are claimed for the new process, a claim operators and engineers present at the demonstration verified. Dust, is said to be less than that in any other type of coal mining, because of the nature of the cutting, better ventilation due to the smaller area being worked and high pressure water sprays built into the cutting head.

The continuous miner replaces a step-by-step mining sequence at the coal face with one complete operation. Current practice in most mines is to cut, drill, blast and load. These operations are performed by machines that must be moved in and out of each mining room in sequence. The new process is expected to salvage some of the time now lost and reduce the number of miners needed per ton of output. Continuous miners are not new in principle but until recently none have proved efficient.

As far as is known, the only other continuous miner recently produced is the "Colmol," a development of Sunnyhill Coal Co. This machine was demonstrated for the press on Oct. 28 of this year. It uses a series of rotary chipping heads that are advanced into the coal seam as the machine moves forward.

J. D. A. Morrow, president of Joy Mfg. Co., said that the company has orders for more than 300 of the new units, which cost almost $50,000 each. He expects to be able to ship 150 machines by Sept. 30, 1949 and to boost output to 50 a month after that.

GM's Teletype System Keeps Central Office In Touch with Branches

Detroit

• • • **A new and completely** modernized private wire teletype system enables General Motors' central office to keep in constant touch with its plants located in 46 cities throughout the United States and Canada.

The new GM network is a two-way system, permitting stations to send and receive simultaneously. All messages are routed through the central office at Detroit. A perforated paper tape creates electrical impulses which spell out the message. The present system can handle approximately 1,360,000 words daily.

Coordination of the productive effort of its various plants, offices and warehouses has become a difficult problem for General Motors since production was resumed after the war. Efforts to obtain adequate material and steel supplies during a period of critical shortages alone has required the development of a communications system with greater speed and flexibility than any previous installation, it is reported.

At the present time three main units of equipment are employed in the automatic switching center in the central office in Detroit. One station receives from 14 incoming lines; another sends on as many outgoing lines. A third switching center is a mechanical "traffic director." The latter "scans" the addresses of messages and sends them to their proper destination. This setup also indicates whether traffic is light or heavy on the various circuits.

When the circuits are open, the perforated tape goes directly through the machines. When traffic is heavy, the tape becomes slack and loops downward. Thus, the size of the loop, if any, indicates traffic conditions on each circuit. When circumstances require additional equipment, it is cut into service.

Under the present GM system, a message from Chevrolet-Baltimore to New Departure-Bristol, Conn., is flashed to Bristol by way of Detroit. The transmission time between all points on the network is about two seconds when intermediate circuits are clear.

Continued Construction Boom May Need 8.5 Million Tons Steel

Washington

• • • **The present** construction boom may be expected to continue throughout all of 1949 according to the first official estimates by government agencies. Physically, the volume is expected to remain at present levels; dollar-wise, it is expected to exceed that of 1948.

Should this forecast hold good, steel requirements for construction materials of all kinds may run as high as 8,500,000 tons.

Last year's needs were originally estimated at 7 million tons. That was when construction volume was expected to amount to no more than $15 billion. But an upsurge shot the 1948 figure to a probable $18 billion which called for 15 pct more steel and other materials.

Initial estimates prepared jointly by the Labor and Commerce Depts. have forecast the 1949 construction volume at $18.7 billion. This is a 4 pct increase over 1948, some of which would be accounted for in higher costs.

The actual physical volume expected to be put in place next year is not figured to be appreciably greater than 1948. This estimate could be thrown out of balance should Congress enact legislation during the coming term which would return the government to the housing picture.

In this event, actual construction might be increased without much increase in total expenditure since publicly financed housing would be largely in the low-cost field. Regardless of additional legislation, the government is planning to increase public housing construction from 15,000 units in 1948 to at least 30,000 in 1949. It is likewise giving closer attention to steel prefabs.

The preliminary governmental construction estimates are based upon expectation of continued high employment and the assumption that building costs will not increase during the 12 months by more than 5 pct.

It is also assumed in the forecast that steel and other building materials production will be adequate to meet the demand. Admittedly, a shift in the distribution pattern could throw present estimates off balance.

Physical Volume To Remain At Present Level But Dollar Value Up

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Private financing will continue to account for major construction in the coming year—and at about the same level as 1948, approximately $13.3 billion. Publicly financed new construction is expected to increase by nearly a billion to a figure of $5 billion.

Privately financed residential construction will account for the largest single category of 1949 building activity as the statisticians now see it. The overall figure is tentatively placed at about $6.5 billion. However, a drop of from 30,000 to 50,000 from the 1948 figure of 875,000 units is expected.

The expected increase of 15,000 houses or apartment units financed by public funds will overcome part of the reduction. In addition, federal agencies concerned are confidently looking for some type of legislation which will put the government further into the housing picture. Some officials privately predict that should this happen, publicly financed units will more than take up the drop in privately financed units.

Aside from residential construction, most types of privately financed non-residential construction are expected to increase over 1948. The tentative overall figure is now in excess of $4 billion or 12 pct higher than the probable total for 1948.

Commercial construction such as stores, garages and so on is still on the uptrend and is expected to be about 15 pct greater than in 1948.

On the other hand, industrial types of construction such as factories and manufacturing plants were on the decline throughout most of 1948. This is expected to drop another 6 pct during the next 12 months to a final total of about $1.3 billion for 1949.

In addition to public housing, new public construction is expected to be increased next year by 24 pct or a billion dollars to reach a total of $5 billion. Nearly half of this amount will go into schools, hospitals and similar institutional work. Highway work will increase by 10 pct to $1.7 billion.

Farm construction is forecast as dropping from a total of $500 million in 1948 to about $450 million in 1949. On the other hand, unless pressure causes a break in the administration's ceiling for defense expenditure, military construction next year will increase by only about $25 million to a total of $175 million.

BUILDING HANGER: *A Chicago contractor has devised this large mobile sheet metal canopy that he moves over his building project during bad weather so that he can keep right on working from the time he starts in on a house until he finishes it.*

Form National Committee For Basing Point Fight

Pittsburgh

• • • **The first** indication of a nation-wide effort for the legislation of a delivered price system during the next session of Congress came with the announcement of the formation of the National Competition Committee in Pittsburgh recently.

The new committee had its beginning in Pittsburgh early in September when a group of industrialists who were concerned about the implications of the Supreme Court decision in the cement case, gathered to form the first local chapter. Since then chapters have been formed in Tulsa, Dallas, Houston, Cincinnati, Dayton, Cleveland, Pittsburgh and Philadelphia. The committee reports that other chapters are now forming in principal cities as rapidly as possible.

Members of the new committee have embarked on a campaign to enlist the strength of natural proponents for the legislation. They have also undertaken the responsibility for outlining to their own employees and Congressmen in their districts the difficulties which they are now facing, or will face, under a mandatory fob pricing system.

The new committee declares that it "in no way parallels the efforts of the associations and organizations which have gone on record as opposing an fob pricing system. It will remain in existence only as long as it takes to get clarification of the present price muddle. Its membership extends to every type of business which absorbs freight in an effort to compete nationally. Ninety pct of its membership could well be termed small business."

The program of the committee is financed by membership dues ranging from $100 to $1000 for each member.

The first national meeting was presided over by John P. Roche, vice president, Heppenstall Co.

Stewart-Warner Dividend

Chicago

• • • **Directors of** Stewart-Warner Corp. have declared two cash dividends on the $5 par value common stock. A dividend of 25 cents per share is payable on Jan. 8, 1949, to stockholders of record at the close of business Dec. 16, while an additional year-end dividend of 50 cents per share will be paid Dec. 24 to stockholders of record Dec. 6, James S. Knowlson, president and board chairman, revealed.

Dividends of 25 cents per share were paid Jan. 10, Apr. 10, July 10 and Oct. 9, 1948.

Armco Wins Safety Award

Middletown, Ohio

• • • **Armco Steel Corp.'s** fabricating division has compiled a record of more than a million work-hours without a major accident.

C. E. Stutenroth, assistant manager of the division, said that the men of the fabricating division had worked a total of 1,030,000 consecutive hours without an accident that caused any of the 700 men to lose work.

The 258 consecutive days of safety places the fabricating division in the lead in the National Safety Council's contest for heavy steel fabricators with a zero accident frequency rate (number of major accidents per million man hours).

The million - work - hours of safety earns for the Armco plant the distinguished service award of the National Safety Council, Mr. Stutenroth said.

Murray Asks Labor Unity

Washington

• • • **Philip Murray,** CIO president, last week issued a call for labor leaders to unite in support of "New Deal principles" and new labor legislation as outlined in the 1948 Democratic platform.

The proposal was contained in letters to leaders of the AFL and the Railway Brotherhoods. Proposing that committees be appointed from each group to meet as quickly as possible, Murray said the election was a mandate for discarding that "evil creature, the Taft-Hartley law."

At such a meeting, he said, the various unions could coordinate "our efforts in supporting a common program of legislative measures for the 81st Congress."

Joins Founders' Society

Cleveland

• • • **Gray Iron** Founders' Society recently admitted to membership the United States Radiator Corp., Detroit. The Detroit foundry specializes in furnace and stove castings. B. F. Emrick will represent his company on society matters.

As a member of the national organization, U. S. Radiator will automatically become a member of the local Detroit Management Group of the society, which will hold regular monthly meetings of gray iron foundry executives in the area for the purpose of discussing common, local problems.

Machine Tools a Problem

London

• • • **The British Assn.** of Used Machine Tool Merchants has asked the Minister of Supply to stop immediately the sale of the remaining stock of government-owned machine tools, according to E. J. F. Bradley, a member of the association.

In a full explanation of the situation to the Minister of Supply, the association stated that the decision to auction these machines was wrong. The only reply received from the Ministry was from the director of disposals, who stated that the views expressed would be given consideration.

Two factors have been bothering the association for some time: sale prices have been ridiculously low and many of the machines which are essential to defense are finding their way out of the country.

Sylvania Buys New Plant

Emporium, Pa.

• • • **Sylvania** Electric Products, Inc., has purchased the plant formerly occupied by the Rumsey Pump Co. at Seneca Falls, N. Y., according to J. C. Farley, general manager of the Radio Tube Div. The plant will turn out television tubes.

The new plant contains approximately 98,000 sq ft of space. After completion it is estimated that it will provide employment for 350 to 400 persons. Acquisition of the plant is consistent with Sylvania's policy of industrial decentralization now operating in 25 plants located in 5 states.

Canadian Output Rebounds

Toronto

• • • **Production of steel** ingots and castings in Canada for October totaled 281,866 net tons, which was an average daily rate of 87.5 pct of total rated capacity.

This compares with 257,865 tons for September, when the average was 82.7 pct, and with 256,461 tons in October of last year when the rate was 85.1 pct of a smaller rated capacity.

Following are comparative monthly production figures for steel ingots and castings for 1948 in net tons:

MONTH	STEEL INGOTS	STEEL CASTINGS
January	247,768	8,958
February	230,183	9,463
March	275,349	10,677
April	254,315	9,951
May	279,688	9,879
June	249,710	9,655
July	238,104	6,768
August	254,362	8,692
September	248,622	9,243
October	272,127	9,739
Total, 10 months	2,550,228	93,025

Following are comparative monthly production figures for pig iron and ferro-alloys for 1948 in net tons:

MONTH	PIG IRON	FERRO-ALLOYS
January	160,042	17,127
February	151,123	11,823
March	172,675	14,293
April	170,785	14,474
May	193,305	18,436
June	183,763	13,502
July	187,940	12,939
August	191,383	12,700
September	182,465	12,318
October	186,424	19,489
Total, 10 months	1,779,905	147,099

Coal Production Lags

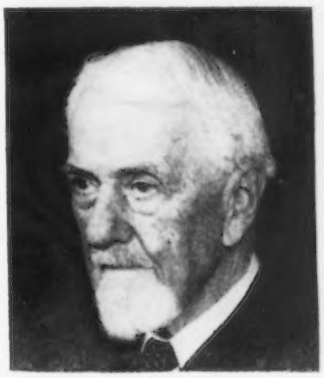
Pittsburgh

• • • **Some 2500 or 10 pct** of the coal miners in District 5 have been idle for 8 weeks due to overproduction in the strip and truck mines, according to John P. Burgarello, district president. They are principally in Washington and Allegheny counties of this area.

Recently the Baltimore & Ohio R. R. announced some layoffs due to a softening of business. This looks bad until some facts are stacked against these: (1) metallurgical coal miners, supplying the mills, are all working, (2) coal companies have long known that use of other fuels was cutting into their market and they are spending a fortune to find other uses for coal, and (3) the B&O derives about half of its revenue from coal handling.

A Man and His Dreams

Coatesville, Pa.



Charles L. Huston

• • • **A unique record** in the annals of the American Steel industry were marked here recently when Charles Lukens Huston began his 74th year of continuous service with Lukens Steel Co.

Mr. Huston, grandson of Dr. Charles and Rebecca Lukens, for whom the company is named, now in his 93rd year, started with the concern on Dec. 15, 1875, as a clerk and bookkeeper in its offices. Today, as first vice president, he is still spry of foot and keen of interest, and he walks to his office daily from his nearby home.

Actually, Mr. Huston's association with the steel company reaches 78 years, for in his teens he wheeled coal and helped with other mill chores—and without pay—while he was on summer vacations from school.

Mr. Huston received $8 a week for his first clerical and bookkeeping job, and "I saved money at that," he remembers smilingly. Despite his literary studies at Haverford College, of which he is the oldest living alumnus, his bent was always toward mechanical things. When opportunity came, therefore, to go into Lukens puddling mill under the guidance of his father's partner, Charles Penrose, he said today, "I did not let it pass me by. I didn't know too much about the puddling of iron to make it malleable by expelling carbon, but I asked my fellow workmen to help me, and they did, and we got on famously well."

Mr. Huston played an important part in this development. He is the patentee of several highly regarded inventions used in the manufacture of steel and he planned and designed Lukens four-high 206-in. mill, world's largest plate mill, and was largely responsible for the installation of the first head-spinning machine at Lukens, during the years (1882-1925) when he was in charge of plant operations. He was elected vice-president of Lukens in 1897, and from 1917 to 1925, he was vice president and works manager. In 1925, he relinquished the position of works manager but continued as first vice-president, a position in which he still serves.

Lukens' 206-in. Mill

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

500 Tons, Bath, Me., crane runway for Bath Iron Works, through Morton C. Tuttle Co., to Berlin Construction Co., Berlin, Conn.

320 Tons, Sterling, Ill., State highway bridge section 18F, to Clinton Bridge Works, Clinton, Iowa.

160 Tons, Brooklyn, N. Y.-Kingsway Jewish Center, Kings Highway and Nostrand Ave., to Grand Iron Works, New York.

130 Tons, Castor, Wyo., Cortez Dams, U. S. Bureau of Reclamation Specification 2472, to American Bridge Co., Pittsburgh.

120 Tons, Newton, Mass., Stowe-Woodward Inc., addition, through J. J. Hawkins Co., Newton, to West End Iron Works, Cambridge, Mass.

110 Tons, Mooseheart, Ill., Church building, to Wendnagle & Co.

100 Tons, Maine, bridges, to Phoenix Bridge Co., Phoenixville, Pa.

100 Tons, Maine, Scituate, Mass., grade school, through R. J. Jaccobbucci, Quincy, Mass., to West End Iron Works, Cambridge, Mass.

100 Tons, Pittsfield, Mass., crane runway for General Electric Co., to James McKinney & Sons, Albany, N. Y.

• • • **Fabricated steel inquiries** this week included the following:

2200 Tons, Hastings, Minn., State Highway bridge over Mississippi River, Clinton Bridge Co. Low bidder.

400 Tons, Beloit, Wis., high school building; previously reported; has now been abandoned.

335 Tons, Detroit, Ore., construction of Detroit Dam, Portland District, Corps Engineers, Portland, Serial Eng—35-026-49-333. Bids to Feb. 25 (tentative date).

• • • **Reinforcing bar awards** this week included the following:

1500 Tons, Los Angeles, bridges on Belhart St. over Los Angeles River, through Guy F. Atkinson Co., to Blue Diamond Corp., Los Angeles.

225 Tons, Wausau, Wis., Marathon Building, through Permanent Construction, to Worden Allen Co., Milwaukee.

• • • **Reinforcing bar inquiries** this week included the following:

2130 Tons, Detroit, Ore., construction of Detroit Dam, Portland District, Corps Engineers, Portland, Serial Eng—35-026-49-333. Bids to Feb. 25 (tentative date).

110 Tons, Long Beach, Calif., incinerator on Pier A, Long Beach Board of Harbor Commissioners, Spec. H.D. 264. Bids to Jan. 14.

105 Tons, Wheeling, Ill., convent building; previously reported; has now been abandoned.

• • • **Tunnel liner awards** this week included the following:

2680 Tons, Riverside Junction, N. D., Tunnel liners through Garrison District, U. S. Engineers, to Commercial Shearing & Stamping Co., Youngstown, Ohio.

50 YEARS AGO

THE IRON AGE, *December 22, 1898*

• Major tinplate producers got together in Chicago last week, tossed all their chips in one pot and labeled it the American Tinplate Co. This is the biggest combo to hit the iron and steel industry to date. Other large capital mergers have enough competition from important independents to prevent absolute control of prices by one company. But, the real power of the new company is not yet fully appreciated in the trade.

• Sam Gompers is still in the saddle. His fight for labor during the last quarter century has again been rewarded with his re-election as president of the American Federation of Labor at its annual convention in Kansas City last week. Sam started the AF of L back in 1865 and has nurtured it all these years.

• A monster multiple drill has invaded the steel industry. The Bausch & Harris Machine Tool Co. has just finished this machine for drilling eight 1½ in. holes in cast iron with an adjuster head which can be easily operated by one man. A second drill of the same size is in the works now.

• Big Mark Hanna, Senator from Ohio, has introduced a bill in the Senate to increase the stature of our merchant marine. The bill carries out generally the recommendations made by President McKinley in his annual communication to Congress. It also parallels legislation in France and Germany who are spending large sums of money annually for the development of their merchant marine.

• Iron ore shipments hit a new high this year as mines shipped almost 3 million tons. Even more is expected next year. Here's how the sources line up: Gogeboc range consisting of the Norrie groups at Ironwood, Mich., 832,348 gross tons; Tilden at Bessemer, 352,445; Vermillion at Ely, Minn., 700,000; Mesabi range at Ely, Minn., 400,032; and the Mountain Iron at Mountain Iron, Minn., on the same range, 650,021 tons. Of the total the Mesabi contributed almost one third.

Alcoa Will Cut Quotas in First Quarter by 25 pct

Pittsburgh

• • • **Aluminum Co.** of America will reduce allocations to customers during the early months of 1949. R. V. Davies, Alcoa's vice-president and general sales manager blamed the cuts on increasing demand and short supply. He added that if current demand continues there can be no appreciable improvement before mid 1949.

A check of consumers shows that sheets will be hardest hit, with first quarter quota cuts slashed by 25 pct or more except to consumers with military orders. Extrusions, forgings and rolled shapes will be about as tight as sheets. Castings will generally take small cuts, if any. Reductions in wrought products will be bigger than those in castings, perhaps 10 pct below current levels.

Mr. Davies gave five reasons for the new tightness in aluminum: (1) Military orders are increasing; (2) droughts in Canada will reduce imports from there at least during the early months of next year; and (3) Alcoa's production capacity will be reduced by about 40 million lb annually when its Niagara Falls smelting works are closed in February because electric power will no longer be available. He also mentioned hydroelectric power shortages in this country and declining scrap supplies.

Bituminous Coal Board Authorizes Budget For Market Research Group

Pittsburgh

• • • **The Board of Directors** of the Bituminous Coal Research, Inc., has authorized a research budget of more than $500,000 for the second consecutive year, according to J. B. Morrow, BCR president. It is the purpose of the board to create new markets for bituminous coal and to hold and expand present markets.

This authorization finances the development of new equipment, methods for more efficient coal utilization, and fundamental research. The funds for BCR research are provided by 340 coal companies, railroads, and manufacturers.

The program outlined by BCR executives at the board's annual budget meeting yesterday in Pittsburgh, authorizes the expenditure of $515,800 to continue the industry-sponsored general research program for 1949.

This budget is exclusive of the programs being conducted by the BCR Mining Development and Locomotive Development committees. The authorized budget does not include substantial sums made available by co-sponsors on certain projects of the general research program.

The work proposed for the coming year is for the most part a continuation of the 1948 program. Attention will be given to further development and commercial introduction of residential heating equipment, new methods of industrial coal utilization, and improved performance of steam locomotives.

Several new projects will be undertaken in 1949, including work on cinder collectors for small plants and locomotive fuel studies. BCR, in cooperation with Battelle Memorial Institute and others, will initiate a program on improved gas producers. Many of BCR's general research projects are conducted at Battelle.

Cooperative research will be conducted with other solid-fuel associations and groups of manufacturers on projects of mutual importance.

Support has been continued to BCR-sponsored fundamental research in coal gasification, com-

bustion and hydrogenation at the Coal Research Laboratory of Carnegie Institute of Technology and at the Massachusetts Institute of Technology, as well as studies of mine drainage at the U. S. Bureau of Mines and West Virginia University. BCR's support of cooperative house-planning research at the University of Illinois, a project leading to greater satisfaction from the use of coal by residential consumers, will be continued.

In announcing the 1949 Budget, J. B. Morrow, BCR president, said that the national research organization of the bituminous coal industry will continue research to increase public acceptance of coal as a fuel, to develop new coal-utilization processes and equipment, and to stimulate and assist research programs by other organizations which have objectives that will improve the competitive position of the coal industry.

Extend Deadline on Bids For Some Egyptian Scrap

Washington

• • • **A total of** 30,000 tons of scrap steel in Egypt is available for purchase by American firms, according to Alex Miller, adviser on scrap iron and steel to the Office of Industry Cooperation.

Bids on this scrap were first invited by the Egyptian State Railway Administration in October with a closing date of Nov. 1. This deadline has now been extended to Dec. 18, 1949. The steel scrap consists of miscellaneous lots in the Egyptian State Railway scrap yard at Alexandria. Offers for direct purchase of the scrap will be considered on the condition that the price be paid in dollars and within one week from the date of notification to the bidder.

American purchasers will be granted the required export licenses and exemption from export taxes by the Egyptian government, Mr. Miller pointed out. Delivery of scrap lots would be on the site with all costs, such as transport and loading, to be borne by the purchaser. All communications conerning this Egyptian scrap offer should be addressed to the Egyptian State Railway Administration, Stores Dept., Cairo Station, Cairo; to Gabbary Stores, Alexandria, or to the Office of the Chief Inspecting Engineer, London.

Navy Undertakes Study To Determine the Short Time Overload of Gears

Pittsburgh

• • • **The short time** overload ability of some kinds of machines can be determined easily. But with others, such allowable overloadings are almost impossible to find out. Although gears are in this class, the U. S. Navy recently undertook a program to investigate this characteristic.

Two sets of standard 6000 hp gears made for naval escort vessels were available as surplus from war stock. They were identical except for the different tooth cutting methods used by the two manufacturers. One of the gear units was built by Westinghouse to the same standard as the larger gears for our biggest fighting ships. These two sets of gears were mounted by the Navy in the Naval Boiler and Turbine Laboratory in Philadelphia in a "front-to-front" arrangement (similar to electrical pump back tests) so that one set loaded the other, and were driven at normal, rated full speed.

Tests of 100-hour duration were run, the loading being increased for successive tests. It was not until they had been loaded to 340 pct of normal that teeth on the bull gear failed. It had operated almost 3000 hr at loads up to nearly 3½ times normal. Even at this point the first reduction gears and pinions showed no signs of tooth distress and were capable of carrying full load indefinitely. No journal bearing failures developed during this extreme test.

These tests indicate that the smoother tooth surface as provided by lapping or shaving has a considerable value in increasing the resistance to pitting, and little effect on the ultimate ability of the gear to carry load. The tests also proved that a long run-in period of operation at light load to achieve a work hardening of the teeth surfaces is not necessary to achieve high load-carrying ability.

Such data will enable gear engineers to design gears more rationally for service requiring short intervals of extreme overloads, such as occur in naval service but seldom occur in other marine or industrial applications.

ASM Putting Finishing Touches on Its Plans For Western Metal Show

Cleveland

• • • **Final Committee** appointments for the coming Western Metal Congress and Exposition have been made, according to an announcement by W. H. Eisenman, National Secretary, American Society for Metals, and Managing Director of the event.

The General Committee, having the responsibility of directing overall policy of the Exposition, is headed by E. R. Babylon, the Kaiser Co. Two vice chairmen on this committee are James B. Morey, International Nickel, and S. R. Kallenbaugh, Timken Roller Bearing Co. W. J. Parsons, Pacific Scientific Co., will serve as secretary of the committee.

Nine ASM chapter chairmen will assist on Mr. Babylon's group—Stuart C. Gillespie, Pacific Metal Co., Seattle, Puget Sound Chapter; C. R. St. John, Permanente Metals Corp., Spokane, Inland Empire Chapter; B. L. Berlien, Industrial Steel Treating Co., Oakland, Golden Gate Chapter; R. J. A. Fricker, Wominion Bridge Co., Vancouver, British Columbia Chapter; Raymond C. Aungst, Oregon Brass Works, Portland, Oregon Chapter; H. E. Fryer, Carnegie - Illinois Steel Corp., Denver, Rocky Mountain Chapter; Howell Drummond, Colorado Fuel & Iron Corp., Pueblo, Pueblo Chapter; Earl Kops, Kops Engineering Service, San Diego, San Diego Chapter; Winfred C. Dyer, Utah Chapter.

Other Committee Chairmen include Los Angeles Executives: Harry H. Beyma, the Kaiser Co., Attendance Committee; Edgar Brooker, U. S. Spring & Bumper Co., Cooperating Societies Committee; W. W. Farrar, Farbest Corp.

Buffalo Forge Dividend

Buffalo

• • • **The Buffalo** Forge Co. declared a dividend of 25 cents a share on the outstanding common stock, bringing total distribution for the calendar year to $4, compared with $3.45 in 1947. Payment will be made Dec. 28 to stock of record Dec. 10.

NEWS OF INDUSTRY

AISI Reports Shipments Of Steel Break Records

New York

• • • **Shipments** of steel products in the first 10 months of 1948 increased 1,879,000 net tons over the similar 1947 period to 54,183,000 tons, according to American Iron and Steel Institute.

Shipments in the final 2 months of the year at the same rate as prevailed a year ago, or slightly less than the October rate, would place the total for the year above 65 million tons, which would be about 2 million tons greater than in 1947, and a record for any year.

Total shipments of steel products in October were 5,952,000 tons, at a rate equivalent to over 70 million tons a year. Shipments in September were 5,511,000 tons and in October, 1947, they were 5,682,000 tons. October shipments were only 26,000 tons less than the peak made in March, 1948.

Greatest increases in tonnage of shipments so far this year over the corresponding months in 1947 have been in sheets and pipe. Shipments of hot and cold rolled sheets and galvanized sheets in 10 months gained more than a million tons over the similar 1947 period, to 13,403,000 tons. Sheets also constituted a greater proportion of total shipments, being 24.7 pct, against 23.6 pct a year earlier. Larger shipments of sheets were due almost entirely to an increase in cold rolled sheets.

Shipments of pipe and tubes, particularly important to the oil and construction industries, were 5,631,000 tons in 10 months, or 10.4 pct of total shipments, compared with 5,025,000 or 9.5 pct in the corresponding 1947 period.

Gray Iron Founders Meet

Dayton

• • • **Use of gray** iron in manufacture of tools and dies has outstanding advantages, including good castability, high compressive strength, wear - resistance and ability for selective hardening, C. O. Burgess, technical director, Gray Iron Founders' Society, told the National Tool & Die Manufacturers' Assn. here. He emphasized the necessity for close cooperation between designers and foundry engineers in developing tools and dies.

MACHINE TOOLS

. . . News and Market Activities

Orders Slipping and Backlogs Diminishing in Spotty Market

• • • **Sales outlook** continues spotty in major sales sectors of the machine tool industry, with orders slipping and backlog diminishing in some plants, while others report increased inquiries and quotations.

Some machine tool sales executives believe that plant layoffs, which have become rather numerous in some industries, notably home appliances, make such industries good potential customers for the latest cost-saving equipment. According to reports, General Electric Co. will retool for a new model refrigerator, and if this may be taken as a token, the machine tool business is due for a shot in the arm.

While ECA approved during November about $10 million in purchase and reimbursement authorizations, arrangements for purchase and delivery are apparently keeping most of this business from getting to the industry. About $2,100,000 of these procurements were approved for first quarter 1949 delivery and $5,500,000 for the second quarter.

In Detroit many machine tool sources have a watchful eye out for any year-end buying by firms with some extra money in the till. Thus far, the results have not been too encouraging, although there are indications that a substantial volume of new orders may materialize before the end of the present tax year.

Present indications are that placements for the new Chevrolet transmission operation at Saginaw will be nearly completed by the end of the month. Other transmission programs are quiet, although it is expected that the Studebaker program may get under way shortly after the start of the new year.

Chrysler is reported to be buying some new equipment at Lunch Road and quotations on new machines have been requested by Kaiser-Frazer.

In Cleveland, active commit-

Installation of Cost-Saving Equipment in Some Plants Viewed as Shot in Arm

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tees of the National Machine Tool Builders Assn. for 1949 were announced by L. D. McDonald, president of NMTBA and vice-president, Warner & Swasey Co.

A. G. Bryant, retiring president of NMTBA and vice-president, Cleereman Machine Tool Co., Chicago, will be chairman of the government relations committee of NMTBA. This committee's objective is to inform Congress and the administrative department of the government on the machine tool industry and to advise machine tool builders regarding developments in Washington.

Other government relations committee members are: M. A. Hollengreen, president, Landis Tool Co.; L. W. Scott Alter, president and general manager, American Tool Works Co.; Ferris M. Angevin, treasurer, Cincinnati Milling Machine Co.; David Ayr, president and general manager, Hendey Machine Co., W. M. Fairbairn, president and general manager, Barnes Drill Co., and M. M. Smith, president, E. W. Bliss Co.

Public relations committee members are: L. W. Scott Alter, chairman; Alfred V. Bodine, president and treasurer, Bodine Corp.; Ralph J. Kraut, president and general manager, Giddings & Lewis Machine Tool Co.; R. W. Glasner, president, Clearing Machine Corp., and Helge G. Hoglund, general sales manager, the Heald Machine Co.

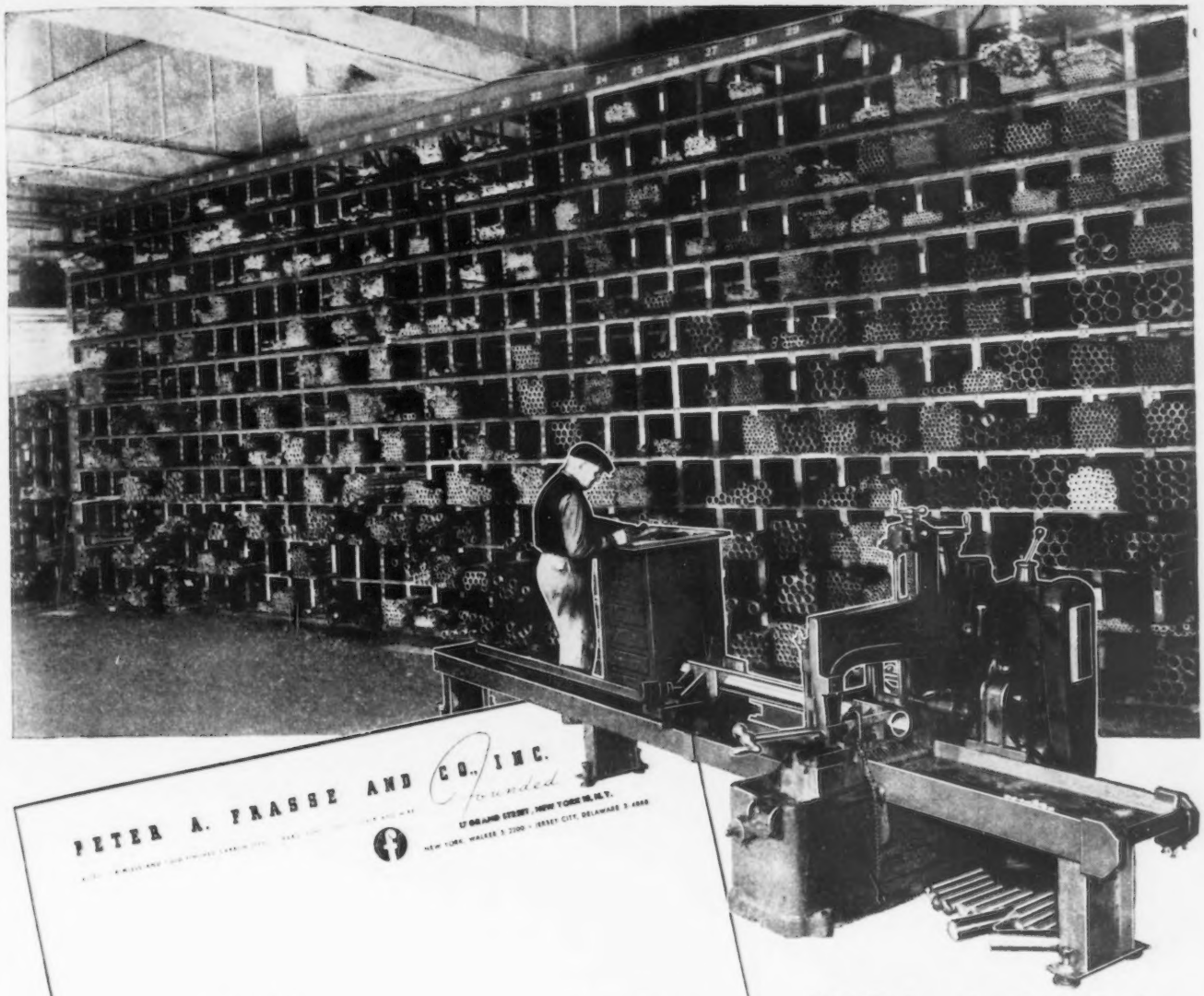
Sales and Service committee members are: James C. Herbert, sales manager, Jones & Lamson Machine Co., chairman; Daniel R. Weedon, assistant manager, Blanchard Machine Co., Swan E. Bergstrom, vice-president, Cincinnati Milling & Grinding Machines, Inc.; C. Denson Day, sales manager, Norton Co.; Donald M. Pattison, vice-president in charge of sales, Warner & Swasey Co., and Jerome A. Raterman, president, Monarch Machine Tool Co.

Qualifications for membership and exhibits committee: Richard E. LeBlond, president, R. K. LeBlond Machine Tool Co., president; Swan E. Bergstrom; Paul R. Hatch, general sales director, Brown & Sharpe Mfg. Co.; George H. Johnson, president, Gisholt Machine Co., and Frank K. Simmons, president, Henry & Wright Mfg. Co.

Apprentice Training Standards: J. Edward Goss, Brown & Sharpe Mfg. Co., chairman; Robert B. Carmichael, supervisor of apprentices, Pratt & Whitney; Kenneth H. Casson, personnel manager, Barnes Drill Co.; Charles R. DeVlieg, secretary, DeVlieg Machine Co., and Edward W. Gressle, personnel manager, Warner & Swasey Co.

Technical Standards Committee: M. H. Arms, chief engineer, Bryant Chucking Grinder Co., chairman; Harold J. Siekmann, chief engineer, R. K. LeBlond Machine Tool Co., and J. Robinson, chief engineer, Vickers, Inc.

Standardization of Hydraulic Elements Committee: J. Robinson, chairman; Earl Cannon, manager hydraulic division, Clearing Machine Corp.; Albert H. Dall, assistant research director, Cincinnati Milling Machine Co.; Bengt Granberg, chief development engineer, Sundstrand Machine Tool Co.; Benjamin P. Graves, director of design, Brown & Sharpe Mfg. Co.; Ralph E. Price, assistant chief engineer, Landis Tool Co.; R. A. Schafer, Chief Development engineer, National Automatic Tool Co., Inc., and Ernst Wiedmann, chief engineer, the Oilgear Co.



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Armstrong-Blum Mfg. Co.
5700 Bloomingdale Avenue
Chicago 39, Illinois

Gentlemen:

We are very satisfied with the performance of the new 6A and 9A Marvel Heavy-Duty Automatic Hack Saw Machines recently installed in our warehouses. Our decision to purchase these new Marvel saws was based on the satisfactory performance we have been receiving for the past 10 years from our original Marvel machines.

In our business of warehouse distribution of carbon, alloy and stainless steel bars and tubes, we are called upon to make accurate cut lengths for customers, and on numerous occasions handle orders for hundreds and sometimes thousands of multiple cut pieces. Our Marvel saws help us to rapidly and efficiently handle such sawing requirements.

Marvel saws and high-speed edge hack saw blades are giving satisfactory performance in all our warehouses, and your service has been most cooperative.

Very truly yours,

PETER A. FRASSE AND CO., INC.

W. E. Davis
Assistant Vice President

WED/amc

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You will get cut-off lengths in any quantity faster from the steel warehouses and stockrooms that are equipped with MARVEL 6A and 9A Automatic Hack Saws. Far faster, floor to floor, than any other hack saws, they save valuable machine hours by reducing cutting-off time to a fraction,—save other machining hours by producing accurately cut pieces of exact length.

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Metal Cutting

MARVEL SAWS

Better Machines—Better Blades

NONFERROUS METALS

. . . News and Market Activities

Scrap Drops Further; Volume of Buying for Conversion Lower

New York

• • • **For the second** week in succession, scrap prices for some metals have dropped by ½¢ per lb, reflecting the lower volume of buying for conversion operations. Scrap copper and brass is flooding into refineries and ingot makers, thrown on the market by producers and dealers who had been holding for higher prices but who are now convinced that lower prices are in prospect. The price reductions affected copper and aluminum scrap, but there is no oversupply of the latter. Refineries have reduced offerings for No. 1 copper to 20½¢ and ingot makers dropped composition to 16½¢. Ingot makers were paying 16¢ for mixed aluminum old cast and old clips. Lead smelting charges are reported to range from $10 to $25 a ton. Dealers say that the scrap market is very uncertain when they attempt to buy at prices based on the new buying levels.

No changes were made in the prices of brass and bronze or aluminum ingot as the result of the new scrap prices. There is not much business on hand for either metal as foundries are already well supplied. The indications are that ingot business may not pick up until mid-January.

The decline in copper scrap prices has been a boon to custom smelters who are now able to go into the market for their own account in order to sell at the 23.50¢ price. It is permitted by the smaller volume of scrap buying by consumers for conversion purposes. Consumers have been alarmed by the growing wave of curtailed buying in the consumer and durable goods industries and are not anxious to add to their inventories of high priced metals in such a market.

Refineries Flooded with Scrap Thrown on Market by Those Biding Higher Prices

o o o

Copper, lead and zinc consumers are still having great difficulty in obtaining metal but producers report that they are not pressing as actively as in recent months due to the recognition of the shortages. The Kennecott strike is continuing without any indication of an early ending. The mediators have proposed a study for job evaluation on which new wage rates could be set. A study of this nature would take some time but it is possible that if accepted by union and management, the early return of strikers pending completion of the study might be possible. Producers have been able to hold the price at 23.50¢ despite heavy demand. Now it is clear that the pressure is off the premium market. Foreign demand for copper is lighter and some producers expect to make no further sales before the first of the year.

Zinc consumers received some good news when they learned that the Australian producers had decided to export half their production next year, and limiting their shipments to Australian consumers to the remaining production. This development was caused by the continuation of the home zinc ceiling price at 3½¢ per lb. Demand for most grades of zinc has been very heavy, especially on the part of galvanizers. Some easing has appeared in the demand for the die casting grade. Offerings of foreign High Grade zinc have been made at 19¢ plus duty and transportation to the Valley. This price would reach well above the delivered price for domestic metal at 18.50¢.

Lead consumers are still suffering from the effect of the St. Joseph Lead Co. strike, but the premium market is on the downgrade. This is reflected in the wide range quoted in smelting charges to be deducted by smelters from the price of primary metal realized on scrap. Some smelters are apparently able to get scrap with a smelting charge set at $20 to $25. Others have reduced their smelting charge to as low as $5 to $10 a ton.

The first evidence of the attitude to be taken by domestic producers toward the continuation of the copper tariff suspension was given by a statement made by Louis Cates, chairman, Phelps Dodge Corp. Mr. Cates favors the continuation of the tariff suspension as a means of holding down further increases in the copper price.

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Short of Aluminum

Seattle

• • • **Pacific Northwest** users of aluminum have been warned that they are in for a more acute shortage than they are now experiencing. R. V. Davies, vice-president of Aluminum Co. of America, places a large part of the responsibility for the scarcity of aluminum on the power shortage in Canada which is said to be even more critical than the local one. Aluminum producers have had to restrict export of this product because of their reduced operations.

Nonferrous Metals Prices

	Dec. 15	Dec. 16	Dec. 17	Dec. 18	Dec. 20	Dec. 21
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$110 to $115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$79 to $81
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$89 to $93
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	21.00*	22.00
No. 120	20.50*	21.50
No. 123	20.00*	21.00
80-10-10 ingot		
No. 305		27.25
No. 315		24.25
88-10-2 ingot		
No. 210		33.00
No. 215		31.00
No. 245	24.75*	25.75
Yellow ingot		
No. 405	17.00*	17.50
Manganese bronze		
No. 421		23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.25–31.75
0.60 copper, max.	30.75–31.25
Piston alloys (No. 122 type)	26.50–27.00
No. 12 alum. (No. 2 grade)	26.25–26.75
108 alloy	26.50–27.00
195 alloy	27.00–27.25
13 alloy	31.00–31.50
AXS-679	27.25–27.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct	28.75–29.50
Grade 2—92 pct-95 pct	27.75–28.50
Grade 3—90 pct-92 pct	26.75–27.50
Grade 4—85 pct-90 pct	26.25–26.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40⅛
Electrodeposited	34⅝
Rolled, oval, straight, delivered	37.34
Ball anodes	38⅜
Brass, 80-20	
Cast, oval, 15 in. or longer	35⅞
Zinc, oval, 99.99	
Ball anodes	
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	
Cadmium	$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ½ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.03	
Copper, drawn		34.28	
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass		29.24	
Commercial bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy, Olympic, etc.	40.49	40.76	41.82
Nickel silver 10 pct		47.17	44.77
Architectural bronze	33.42		

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turnings
Copper	21⅛	20⅝
Yellow brass	18⅞	18⅛
Red brass	20	19¼
Commercial bronze	20⅛	19⅝
Manganese bronze	18⅝	17⅞
Leaded brass rod ends	18⅛	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.50–20.50
No. 2 copper wire	19.50–19.50
Light copper	18.50–18.50
Refinery brass	18.25–18.50

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.50–16.50
No. 1 comp. turnings	16.25–16.25
Rolled brass	12.75–13.25
Brass pipe	13.25–13.75
Radiators	14.00–14.50
Heavy yellow brass	12.50–12.75
Aluminum	
Mixed old cast	16.00
Mixed old clips	16.00
Mixed turnings, dry	14.50
Pots and pans	16.50
Low copper	19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18½—19
No. 2 heavy copper and wire	17½—18
Light copper	16½—17
Auto radiators (unsweated)	12 —12¼
No. 1 composition	14½—15
No. 1 composition turnings	14 —14½
Clean red car boxes	12 —12½
Cocks and faucets	12 —12½
Mixed heavy yellow brass	9 — 9½
Old rolled brass	11½—12
Brass pipe	13 —13½
New soft brass clippings	15 —15½
Brass rod ends	13 —13½
No. 1 brass rod turnings	12½—13

Aluminum

Alum. pistons and struts	8 — 8½
Aluminum crankcases	12 —12½
2S aluminum clippings	16 —16½
Old sheet & utensils	12 —12½
Borings and turnings	6 — 6½
Misc. cast aluminum	12 —12½
Dural clips (24S)	12 —12½

Zinc

New zinc clippings	11 —11½
Old zinc	9½—10
Zinc routings	5¼— 5¾
Old die cast scrap	6¼— 6¾

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	22 —23
Nickel rod ends	21 —22
New Monel clippings	15½—16½
Clean Monel turnings	11 —12
Old sheet Monel	13 —14
Old Monel castings	10 —11
Inconel clippings	12 —13
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	7 — 7½

Lead

Soft scrap lead	18 —18½
Battery plates (dry)	12 —12½

Magnesium Alloys

Segregated solids	8 — 9
Castings	4½— 5½

Miscellaneous

Block tin	82 —84
No. 1 pewter	65 —67
No. 1 auto babbitt	51 —53
Mixed common babbitt	19 —19½
Solder joints	21½—22½
Siphon tops	50 —52
Small foundry type	20½—21
Monotype	19½—20
Lino. and stereotype	19 —19½
Electrotype	17½—18
New type shell cuttings	15½—16
Hand picked type shells	6½— 7
Lino. and stereo dross	10½—11
Electro dross	7 — 7½

SCRAP

. . . News and Market Activities

Holidays Bring Wait-And-See Attitude

New York

• • • **After the dip** in cast prices last week the market was generally quiet this week with the exception of the Chicago area. A heavy snow fall and the holiday period have set up much of a wait-and-see atmosphere with little further change seen until after the beginning of the year.

Dealer scrap fell off $2 in Chicago. Turning and boring price offers were lower with few sales being made there. One large consumer has withdrawn from the market until Jan. 1 and railroad scrap showed a further decline again this week. The dip in these grades, observers claim, is due to comfortable position of the mills and a drive to reduce year-end inventories. Railroad prices there appear poised for further decline.

Mixed yard cast took another dip in the Philadelphia market this week to go at $59 to $60 while the New York market fell off slightly for the first time.

Snow this week brought forth the first test for scrap movement. It was slowed down to a halt in some areas. But signs of better weather minimize the normal effects of such conditions.

The cast market generally has a very weak tone throughout all market areas. Little or no change in the condition is expected until after the New Year. In fact a terriffic test is expected at that time in the cast market because many of the big consumers are reported to have inventories that range into 3 to 4 months. This would take them well into the Spring, a time at which normal movement of scrap will have been resumed.

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PITTSBURGH—Any possibility of a general price softening has been buried under a blanket of snow. Normally, heavy snow strengthens scrap prices but there are no signs of such a trend now because consumers inventories are generally in fine shape. Bad weather has been late and stockpiles built up far above their normal level for late December. Further, the heavy proportion of scrap moving direct from fabricator to mill reduces the flow through dealers and minimizes the effect of weather. Prices here were unchanged during the past week. Dealers and brokers report new business in cast iron unobtainable at any price but demand from outside the district leaves local price quotations unchanged.

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CHICAGO—Dealer scrap fell off $2 in Chicago last week. At present time turning and boring price offers were lower with only a few sales made. One local mill is buying dealers bundles at the lower price. Other mills are out of the market. Carnegie told THE IRON AGE they would buy no more scrap before Jan. 1. Offers of No. 2 heavy melting have been made at the lower price also. Railroad scrap showed further decline. The dip, observers claim, is due to comfortable mill position and the year end drive to lower inventories. Railroad specialties appear poised for further decline.

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PHILADELPHIA—The 7 to 8 in. snowfall that fell over the weekend in this area, accompanied by some freezing temperatures, will have a retarding effect on yard operations. So far there has been no evidence that mills have been made anxious over scrap because of their present comfortable stocks. The foundry cast market is still weaker and there has been very little business to establish the market. Foundries were not buying, due to their declining backlogs and the fact that pig iron seems to be in greater supply. Low phos grades are difficult to move and a tonnage was moved at $49.50. Electric furnace users are largely out of market. Turnings are in short supply and the market is stronger. Caution is being shown in the bidding on railroad lists but there is no doubt that these grades will continue to demand premiums.

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CLEVELAND—Bulk of the big consumers in this area are out of the market until the end of the year, and perhaps for a few weeks longer. The market here and in the Valley is quiet and stable, and indications are that it will not go below current levels, despite the shipments of the past few days, which one mill buyer described as "terrific." Buying is likely to become more selective. No. 2 bundles, for example, may follow the pattern of another district with a $2 drop in price. Cast grades are weaker, and material is being held back at present price levels. Shipments of all grades of scrap are likely to fall off during the next 6 weeks, but by the end of January mills will begin to anticipate spring shipments.

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DETROIT—The Detroit scrap market continues on the soft side although this condition is not yet reflected pricewise in the market. The unusual situation in which machine shop turnings are temporarily selling above short shovel material, continues, although this situation is expected to change momentarily. There are also indications that cast iron scrap prices may slip to a lower level in the near future.

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CINCINNATI—Trade sources anticipate no substantial change in the market here for the next week or so. Openhearth material continues in strong demand, with supply spotty. Cast grades are weaker, but whether this weakness is due to the holiday period or a clean-up of year-end inventories, or a bona fide decline in demand is the subject of considerable speculation. Quality tonnage is still bringing the price. The real test on cast will probably come from the south when, for example, Birmingham drops out. Shipments of openhearth and blast furnace material are good, but will probably fall off after the first of the year.

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NEW YORK—Following a softness which has existed for several weeks, cast grades slipped in this market area this week. Mixed yard cast is down $1, going at $56 to $57, while heavy breakable and charging box cast dropped 50c to sell at $55.50 to $56.50. Only one of three large consumers of mixed yard cast is still taking any of that grade. Most of the large foundries are well fixed with supplies, some as well as 3 to 4 months. This is a bad time to indicate what the future in the cast market has in store for the future. But at present the market is definitely weak.

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BUFFALO—Inventory-conscious scrap consumers took it easily last week and the market action slowed accordingly. Leading mills have good stocks in hand and relighting of a blast furnace helped improve the position of one interest. Two foundries held up shipments until after the holidays, contributing to further softness in cast grades, and a major consumer of low phos was out of the market with a 3-month stockpile. No. 1 heavy melting was variously listed as strong and easy, but prices held within the old range. Pennsylvania R. R. list omitted No. 1 railroad heavy melting, but in the last New York Central list it went at $50. The Central also offered some 5 foot by 18 inch stuff as low phos that brought the identical figure. More openhearth tonnage was reported coming from downstate points as Pittsburgh district interest lagged. Demand for blast furnace scrap at over-the-market prices seemed less urgent.

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BOSTON—Over-the-market buyers who have been active here for many months, have made a mass withdrawal, and the latest prices indicate that No. 2 heavy melting steel, No. 1 and 2 bundles and bushelings are now commanding the single formula quotation of $34.40. No. 1 heavy melting still, on occasions, sells for as high as $38.90, but the market, according to brokers, is very dull and prices tend toward the weaker side. The spread on shoveling turnings increased somewhat from $31.40-$32.50 to $31-$33.50. Chemical borings are not being taken and cast is even harder to move.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	58.00 to 59.00
Rails 2 ft and under	62.00 to 62.50
No. 1 comp'd bundles	42.50 to 43.00
Hand bdld. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.00 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	69.50 to 70.50
Mixed yard cast	64.00 to 65.00
Hvy. breakable cast	62.00 to 63.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	57.00 to 58.00
RR. coil springs	57.00 to 58.00
RR. leaf springs	57.00 to 58.00
Rolled steel wheels	57.00 to 58.00
Low phos.	49.50 to 50.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.50 to $42.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	39.50 to 40.00
Bundled mach. shop turn.	39.50 to 40.00
Galv. bundles	37.00 to 38.00
Mach. shop turn.	35.50 to 36.00
Short shov. turn.	37.50 to 38.00
Cast iron borings	36.50 to 37.00
Mix. borings and turn.	35.50 to 36.00
Low phos. hvy. forge	51.00 to 52.00
Low phos. plates	49.00 to 50.00
No. 1 RR. hvy. melt.	44.25 to 48.00
Rerolling rails	69.00 to 70.00
Miscellaneous rails	62.00 to 64.00
Angles & splice bars	55.00 to 56.00
Locomotive tires, cut	52.00 to 53.00
Cut bolster & side frames	51.00 to 52.00
Standard stl. car axles	84.00 to 86.00
No. 3 steel wheels	49.00 to 50.00
Couplers and knuckles	50.00 to 51.00
Rails, 2 ft and under	58.00 to 59.00
Malleable	82.00 to 83.00
No. 1 mach. cast	68.00 to 69.00
No. 1 agricul. cast	60.00 to 62.00
Heavy breakable cast	60.00 to 62.00
RR. grate bars	60.00 to 61.00
Cast iron brake shoes	59.00 to 60.00
Cast iron car wheels	64.00 to 65.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast.	65.00 to 66.00
Hvy breakable cast	59.00 to 60.00
Rails 18 in. and under	61.00 to 63.00
Rails random length	56.00 to 57.00
Drop broken	69.00 to 70.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.90
No. 2 hvy. melting	34.40 to 34.40
Nos. 1 and 2 bundles	34.40 to 34.40
Bushelings	34.40 to 34.40
Shoveling turn.	31.00 to 33.50
Machine shop turn.	29.40 to 31.00
Mixed bor. and turn.	29.40 to 31.00
Cl'n cast chem. bor.	nominal
No. 1 machinery cast.	64.00 to 65.00
No. 2 machinery cast.	57.00 to 59.00
Heavy breakable cast.	52.50
Stove plate	54.50 to 55.50

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	$32.50 to 33.00
Machinery cast	61.00 to 63.00
Mixed yard cast	57.00 to 58.00
Shoveling turn.	31.50 to 32.00
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	31.50 to 32.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.00 to 45.00
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	37.00 to 38.00
Shoveling turn.	41.00 to 41.50
Mixed bor. and turn.	36.75 to 37.25
Clean cast chemical bor.	nominal
No. 1 machinery cast.	65.00 to 66.00
No. 1 mixed yard cast.	59.00 to 60.00
Hvy. breakable cast.	61.00 to 62.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. acid, openhearth	48.50 to 49.50
Low phos., electric furnace	50.00 to 51.00
Low phos. bundles	46.00 to 47.00
RR. steel wheels	54.00 to 55.00
RR. coil springs	54.00 to 55.00
RR. malleable	80.00 to 82.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires, uncut	47.00 to 48.00
Mis. std. sec. rails	57.00 to 58.00
Steel angle bars	55.00 to 57.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	49.00 to 50.00
Steel car axles	73.00 to 75.00
Brake shoes	56.00 to 57.00
Malleable	77.00 to 78.00
Cast iron car wheels	65.00 to 66.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 bunsheling	40.00
Long turnings	$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 cupola cast.	71.00 to 73.00
Stove plate	65.00 to 67.00
No. 1 RR. hvy. melt.	41.00
Steel axles	51.00 to 52.00
Scrap rails	44.00 to 45.00
Rerolling rails	65.00 to 67.00
Angles & splice bars	53.00 to 54.00
Rails 3 ft & under	53.00 to 54.00
Cast iron carwheels	63.00 to 64.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.50 to $43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bor. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast.	59.00 to 60.00
Mixed yard cast	56.00 to 57.00
Heavy breakable cast.	55.50 to 56.50
Charging box cast.	55.50 to 56.50
Unstrp. motor blks.	53.50 to 54.50
Cl'n cast chem. bor.	nominal

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$47.00 to $49.00
No. 2 hvy. melting	41.75 to 42.25
No. 1 bundles	41.75 to 42.25
No. 2 bundles	41.75 to 42.25
No. 1 busheling	41.75 to 42.25
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	38.75 to 39.25
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast.	67.00 to 68.00
Mixed yard cast.	63.00 to 66.00
Stove plate	63.00 to 66.00
RR. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	.... 58.00
Rails 3 ft & under	63.00 to 64.00
RR. steel wheels	56.00 to 58.00
RR. coil & leaf spgs.	56.00 to 58.00
RR. knuckles & coup.	56.00 to 58.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $42.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	72.00 to 74.00
Malleable	79.00 to 81.00
RR. cast.	75.50 to 77.00
Railroad grate bars	58.00 to 61.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	$40.00 to 42.00
No. 1 cupola cast.	40.00 to 50.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$30.00 to $33.00
Elec. fur. 1 ft and under	40.00 to 42.00
No. 1 cupola cast.	50.00 to 54.00
RR. hvy. melting	30.00 to 33.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$48.00 to 50.00*
No. 2 cast	44.00 to 45.00*

*Ceiling Price

Comparison of Prices . .

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Dec. 21, 1948	Dec. 14, 1948	Nov. 23, 1948	Dec. 23, 1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15
Wire: (cents per pound)				
Bright wire	4.256	4.256	4.256	3.55
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.75
Light rails	3.55	3.55	3.55	3.10
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†
Wire rod and Skelp: (cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron: (per gross ton)	Dec. 21, 1948	Dec. 14, 1948	Nov. 23, 1948	Dec. 23, 1947
No. 2, foundry, Phila.	$51.56	$51.56	$51.56	$40.97
No. 2, Valley furnace	**46.50**	**46.50**	**46.50**	**36.50**
No. 2, Southern Cin'ti	49.47	49.47	49.47	40.24
No. 2, Birmingham	43.38	43.38	43.38	34.88
No. 2, foundry, Chicago†	46.00	46.00	46.00	36.00
Basic del'd Philadelphia	**50.76**	**50.76**	**50.76**	**40.47**
Basic, Valley furnace	**46.00**	**46.00**	**46.00**	**36.00**
Malleable, Chicago†	46.50	46.50	46.50	36.50
Malleable, Valley	**46.50**	**46.50**	**46.50**	**36.50**
Charcoal, Chicago	**73.78**	**73.78**	**73.78**	**56.04**
Ferromanganese‡	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ Average of U. S. prices quoted on Ferroalloy page.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	$42.75	$42.75	$42.75	$40.00
Heavy melt'g steel, Phila.	44.50	44.50	44.50	40.50
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	38.75
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	34.75
Low phos. Young'n	47.75	47.75	47.75	47.25
No. 1, cast, Pittsburgh	70.00	70.00	70.00	54.50
No. 1, cast, Philadelphia	65.50	65.50	66.50	55.50
No. 1, cast, Chicago	68.50	70.00	72.50	63.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.00	$15.00	$15.00	$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	94.00
Zinc, East St. Louis	17.50	17.50	17.50	10.50
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	**17.00**	**17.00**	**17.00**	**15.00**
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Dec. 21, 1948	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One week ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One month ago	3.75628¢ per lb.	$46.82 per gross ton	$43.00 per gross ton
One year ago	3.19541¢ per lb.	$37.06 per gross ton	$39.75 per gross ton

	HIGH		LOW		HIGH		LOW		HIGH		LOW	
1948	3.75700¢	July 27	3.22566¢	Jan. 1	$46.82	Oct. 12	$39.58	Jan. 6	$43.16	July 27	$39.75	Mar. 9
1947	3.19541¢	Oct. 7	2.87118¢	Jan. 7	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.83599¢	Dec. 31	2.54490¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.44104¢	Oct. 2	2.54490¢	Jan. 2	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.30837¢	Sept. 5	2.21189¢	Oct. 5	$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.29176¢		2.29176¢		23.61		23.61		$19.17		$19.17	
1942	2.28249¢		2.28249¢		23.61		23.61		19.17		19.17	
1941	2.43078¢		2.43078¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov 5	17.83	May 14	13.42	Dec. 10	10.33	Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13	9.50	Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8	6.75	Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6	8.50	Dec. 29
1930	2.25488¢	Jan. 7	1.97319¢	Dec. 9	18.21	Jan. 7	15.90	Dec. 16	15.00	Feb. 18	11.25	Dec. 9
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00														
Alloy	$51.00						(per net ton)								
BILLETS, BLOOMS, SLABS Carbon, rerolling[12]	$52.00				$52.00	$52.00	(per net ton)						$52.00		
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)						$61.00		
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)								
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05[13] 4.10[14]	
SHEETS Hot-rolled[6]	3.25 to 3.30	3.25	3.25	3.25–3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95[15]	5.65
Cold-rolled[1]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40			5.15[15]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes[2] (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[3]	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	5.90
Cold-rolled[4]	4.00	4.25		4.00	4.00	4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb.[5] base box	$6.80	$6.80	$6.80		$6.90			$6.90	$7.00	Warren, Ohio = $6.80				Pittsburg, Cal. = $7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55-70 lb, 75-95 lb, 100-128 lb	Deduct $1.60, $1.70 and $1.60 respectively from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[10]	4.75	4.75	4.75					4.85							
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35	3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet)[7]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35		3.35	4.05 to 4.10	5.30
Cold-finished[8]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon = 3.75				4.05	3.75	4.80[14]	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65	Massillon = 4.65			Worcester 4.95				
PLATE Carbon steel[11]	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40	3.45	3.40	3.45 Coatesville = 3.75, Claymont = 3.95 Geneva = 3.40, Harrisburg = 6.50				3.65	3.45	4.30[16]	5.80
Floor plates	4.55	4.55		4.55				Cons hohocken = 4.55							
Alloy	4.40	4.40							Coatesville = 5.10						
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30	Bethlehem = 3.30, Geneva, Utah = 3.25						3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE[9] Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth = 4.15, Worcester = 4.45				4.15	5.15[13]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester = 5.50 New Haven, Trenton = 5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging	24.25-26.50	24.25-26.50	26.25-28.75	25.50-27.75	39.00-42.75	32.75-35.75	19.50-21.50	20.00-21.75	20.00-21.75
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets	37.50-40.75	37.50-40.75	39.50-43.00	39.50-43.00	53.00-57.25	50.00-54.00	33.00	33.50	35.50 .....
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50-30.75	33.00-33.50	36.50-39.50	35.00-35.75	55.00-57.25	48.50-50.00	27.00	33.50	27.50 .....

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil harden manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70 to 9.20
Dynamo	7.50 to 10.00
Transformer 72	8.05 to 11.80
Transformer 65	8.60 to 12.35
Transformer 58	9.30 to 13.05
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails (from billets) per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.
†CF&I and Inland, $3.50.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad 10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad 10 pct, f.o.b. Coatesville.	36.00	
Monel-clad 10 pct, f.o.b. Coatesville.	29.00	
Alumnized steel sheets Hot dip, 20 gage, f.o.b. Butler, Pa.	....	9.25

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads†† ..	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire ...	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡ .	5.25	6.20
Cut nails, carloads‡‡	6.75	....

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled	6.05	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
Galvanized	....	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes	....	5.10	....	....	5.10	5.10	5.10	....	....

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld	Black	Galv.
½-in.	43 to 41	20 to 18
¾-in.	46 to 44	24 to 22
1-in.	48½ to 46½	27 to 25
1¼-in.	49 to 47	27½ to 25½
1½-in.	49½ to 47½	28 to 26
2-in.	50 to 48	28½ to 26½
2½ to 3-in.	50½ to 49½	29 to 27
Steel, lapweld		
2-in.	39½	17½
2½ to 3 in.	39½	21½
3½ to 6 in.	46½ to 42	20½ to 24½
Steel, seamless		
2-in.	38½ to 27	16½ to 5
2½ to 3-in.	41½ to 35	19½ to 10½
3½ to 6-in.	43½ to 38½	21½ to 16½
Wrought Iron, buttweld		
⅛-in.	+20½	+52½
¼-in.	+10½	+41½
⅜ & 1¼-in.	+ 4½	+32½
2-in.	— 1½	+29
3-in.	— 2	+28½
Wrought Iron, lapweld		
2-in.	+ 7½	+36½
2½ to 3½-in.	+ 5	+32
4-in.	list	+26
4½ to 8-in.	+ 2	+27½

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	20½ to 18½
¾-in.	46 to 44	24½ to 22½
1-in.	48 to 46	27½ to 25½
1¼-in.	48½ to 46½	28 to 26
1½-in.	49 to 47	28½ to 26½
2-in.	49½ to 47½	29 to 27
2½ to 3-in.	50 to 48	29½ to 27½
Steel, lapweld		
2-in.	39½	18½
2½ to 3-in.	44½	23½
3½ to 6-in.	48 to 44	23 to 27
Steel, seamless		
2-in.	37½ to 32½	16½ to 11½
2½ to 3-in.	41½ to 36½	20½ to 15½
3½ to 6-in.	45	24
Wrought Iron, buttweld		
⅛-in.	+16	+46½
¼-in.	+ 9½	+39½
⅜ to 2-in.	— 1½	+28½
Wrought Iron, lapweld		
2-in.	+ 4½	+33
2½ to 4-in.	— 5	+21½
4½ to 6-in.	— 1	+26

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in In.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $106.70
6 to 24-in., del'd N. Y. ..... 103.50 to 108.40
6 to 24-in., Birmingham 93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 120.30
Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quentities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	19
Milled studs	5
Flat head cap screws, listed sizes	28
Fillister head cap, listed sizes	

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, Bessemer	$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	30.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	$2.55
Chromium, electrolytic, 99% min.	$3.50
Lead	27.80¢
Manganese	55.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	$1.155
Tungsten, 99%	$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.00 to $18.00
Foundry, Byproduct	
Buffalo	$22.75 to $23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	*Std. ⅜-in. grains*
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (18 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$5.15-5.71	$6.31-6.57	$7.27-7.52	$5.35-5.66	$6.51	$5.37-5.52	$5.09-5.24	$5.35-5.57	$6.16-6.31	$9.14	$9.29	$10.54	$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34	....	5.53	5.33-5.39	5.39	6.13	....	....	....	....
Chicago	4.85-5.10	5.75-5.95	7.15-7.30	4.85-5.30	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.02-5.07	5.92	7.12-7.47	5.02-5.37	6.32	5.22-5.27	5.07	5.07	5.87	9.15-9.17	9.32	10.52-10.57	10.67-10.72
Norfolk	5.75	....	....	....	....	6.00	6.00	6.00	....	....	....	....	....
Cleveland	4.98-5.20	5.75[1]-6.04[1]	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85	5.75	7.65	5.56	6.35	5.35	5.10	5.05	5.90	9.70	9.95	11.15	11.40
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36[5]	5.82-6.21[5]	6.97-7.65	5.25-5.62[5]	6.31	5.50-5.71[5]	5.30-5.47[5]	5.30-5.62[5]	6.06-6.17[5]	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.64	5.19-5.79	6.49	5.39-5.44	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75[1]	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.41	6.31	7.30-7.71	5.41	....	5.66	5.46	5.46	6.26	9.91	10.10	11.36	11.61
Omaha	5.92	....	9.18	5.92	....	6.17	5.97	5.97	6.77	....	....	....	....
Birmingham	5.05[11]	6.38	8.45	5.05[11]	6.38	5.25[11]	5.00[11]	5.00[11]	6.66	....	....	....	....
Houston	6.40	....	8.80	6.75	....	6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85[1]-7.90	7.95-8.90	6.60-6.66	9.35[5]	6.10-7.40	5.75-5.90	6.05	7.85[15]-8.45	10.90	10.85	12.40	12.65
San Francisco	5.95[5]	7.15[2]	8.25-8.90	6.75[5]	8.25	6.30-7.60	5.90-6.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50[4]	8.00[2]	8.15[2]-8.45[2]	6.85[4]	....	6.30[4]	6.25[4]	6.25[4]	8.25[4]	....	10.45[15]	....	12.05[15]
Seattle	6.20[4]-6.30[4]	7.75[2]-7.85[2]	7.65-8.00	6.55[4]-6.65[4]	....	6.20-6.30	6.15-6.25	6.05[4]-6.15[4]	8.00[14]-8.10[14]	....	10.30[15]-10.40[15]	....	12.00[15]-12.05[15]
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.59	....	5.75-6.65	6.65-7.00	6.95-7.25	7.55-8.40	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	....	....	....	....
Birmingham	42.88	43.38	....	....	....
Buffalo	47.00-48.00*	47.00-48.00*	47.50-48.50*	....	....
Chicago	46.00	46.50	46.50	47.00	....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	....
Erie	46.00	46.50	46.50	47.00	....
Everett	....	49.50	50.00	....	....
Granite City	47.90	48.40	48.90	....	....
Ironton, Utah	62.00	62.50	....	....	....
Lone Star, Texas	....	75.00†	....	....	....
Neville Island	46.00	46.50	46.50	....	....
Provo	46.00	46.50	....	....	....
Sharpsville	46.00	46.50	46.50	47.00	....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	....
Swedeland	50.00	50.50	51.00	51.50	....
Toledo	46.00	46.50	46.50	47.00	....
Troy, N. Y.	....	....	....	....	54.00
Youngstown	46.00	46.50	46.50	....	....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	....	49.50	50.00	....	....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90	....	....	....	....
Cincinnati	Birmingham	8.09	48.97	49.47	....	....	....
Jersey City	Bethlehem	2.39	50.39	....	....	....	....
Los Angeles	Provo	6.93	52.93	53.43	....	....	....
Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21	....	....	....	....
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Provo	6.93	52.93	53.43	....	....	....
Seattle	Provo	6.93	52.93	53.43	....	....	....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	....

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo $60.75. Add $1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn. Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$160
F.o.b. Johnstown, Pa.	$162
F.o.b. Sheridan, Pa.	$160
F.o.b. Rockwood, Tenn.	$165
F.o.b. Etna, Pa.	$163

$2.00 for each 1% above 82% Mn; penalty, $2.00 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$61.00	$62.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.

Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth $84.00, foundry, $85.00; $84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	5.90
Ton lots	7.50
Less ton lots	8.40

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.50
50% Si	10.50
75% Si	13.00
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carload	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr. 1% max. Fe.

0.20% max. C.	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.

30-33% Ca, 60.65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.35
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound Contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.75
Less ton lots	2.80
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.40
Less ton lots	1.45
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.40¢
Ton lots	9.30¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00
Ton lots, packed	11.25
Less ton lots	11.75

Boron Agents

Contract prices per pound of alloy, delivered.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25

(CONTINUED FROM PAGE 90)

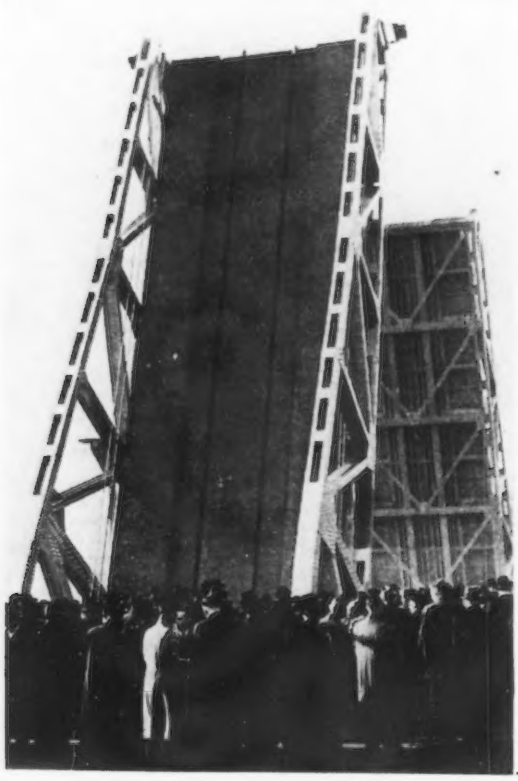
The first has already been discussed. It is to cling on to the present position while economic unrest and Communist treachery gradually lead to the crumbling of the regime. The second is to seek some sort of rapprochement with the west.

There should be no mistake about the amount of crow Tito would have to swallow to achieve even a minimum understanding with the western Powers. It may not seem that their terms are heavy. Indeed, they are not. Nevertheless, they demand some striking departures from current Yugoslav practice. In the economic field the British must demand the payment of reasonable compensation to nationalized British interests in Yugoslavia. This may stick in the throats of demagogues who for years past have demanded the expropriation of the foreign capitalist plunderers, but surely British firms may ask for terms as favorable as have already been granted to Swedes and Swiss? This economic precondition of better relations is, however, relatively unimportant compared with the demands which must be put forward in relation to Tito's foreign policy. Yugoslavia would surely be required to cease all aid to the Markos rebels; to stop military threats to the frontier of Trieste and subversive activity within the city itself; and to show neutrality in the event that the western Powers should be obliged to take any action against Albania. It would probably be unwise to press the point further and to demand a more general detachment from Soviet diplomacy. But, in the Balkans, the western conditions are limited and specific and therefore stand a better chance of being the basis of a bargain.

The most delicate point of all, however, is the question of political freedom for the friends of the west inside Yugoslavia. Tito is a convinced Marxist, and does not intend to abandon his aim of transforming Yugoslavia into a state of the Soviet type. The western Powers on their side are not dictating the social system of Yugoslavia; they wish neither to overthrow nor to bolster up the Tito regime as such. They do object, however, to the persecution of Yugoslav subjects who have shown themselves their friends, simply and solely because they are their friends. But Tito no doubt fears that if he releases those unjustly imprisoned and relaxes police pressure on western sympathizers he will soon find himself dependent on the support of **non-Communists.** Then the dictatorship of the Communist Party will have to be modified, non-Marxist democrats will recover influence, and the achievement of Communism in Yugoslavia will be indefinitely postponed. This is the real dilemma facing Tito—to modify his program of total Communism or to risk the total disappearance of his regime, to choose between a partial loss of power or a complete loss of power and possibly of life as well.

TITO is not, however, alone in facing this unpalatable choice. He must consider the men around him. He, trained in the Comintern, might prefer everything to capitulation to the west. But what of his colleagues? The top ranks of the Yugoslav armed forces and bureaucracy are filled with men who have not long been—and some who are still not—members of the Communist Party. They joined or supported the Party during the war, because it stood for resistance to the Axis and a social revolution which they hoped would sweep away the rot of past regimes. These men have always been passionate nationalists. For them, the victory of the Partisans was to mean the regeneration and territorial expansion of Yugoslavia, which was to become a powerful state, almost a Great Power. They favored Russia because they thought it the generous big brother of all Slavs, both a mighty military force and a land of liberty and justice. But events are showing them that the threat to Yugoslavia's independence, let alone its future greatness, comes not from the west but from Russia. It is the Soviet Union that is the imperialist Power.

It is with these men that the western Powers should seek in the first place to establish contact. If a reorientation is to be brought about in Tito's policy, it is most likely to come as a result of their pressure and influence. The methods whereby such contacts can best be made cannot usefully be canvassed in public. But there is one means which cannot and must not be overlooked—radio propaganda, or to use the more exact language of four years ago, political warfare. From Britain at least the Yugoslavs must hear, in their own language, an explanation of the real dangers.



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ALUMINUM BRIDGE: *Minister of Supply, Rt. Hon. A. J. Barnes is shown opening what is claimed to be the first aluminum alloy bascule bridge in the world at Port of Sunderland, Britain. Four 25 hp electric motors raise the leaves in 60 to 80 sec, in the same manner as those of the Tower Bridge in London.*

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